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AMERICAN

MEDICAL BOTANY,

BEING A COLLECTION

OF THE

NATIVE MEDICINAL PLANTS

OF THE

UNITED STATES,

CONTAINING THEIR

BOTANICAL HISTORY AND CHEMICAL ANALYSIS,

AND PROPERTIES AND USES

IN

MEDICINE, DIET AND THE ARTS,

WITH

COLOURED ENGRAVINGS.

BY JACOB BIGELOW, M. D.

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DISTRICT OF MASSACHUSETTS, TO WIT:

District Clerk's Office.

BE it remembered, that on the twenty eighth day of October, A. D. 1818, and in the forty third year of the Independence of the United States of America, Jacob Bigelow, M. D. of the said district, has deposited in this office the title of a book, the right whereof he claims as author, in the words following, viz.

"American Medical Botany, being a collection of the native medicinal plants of the United States, containing their botanical history and chemical analysis, and properties and uses in medicine, diet and the arts, with coloured engravings. By Jacob Bigelow, M. D. Rumford Professor and Lecturer on Materia Medica and Botany in Harvard University. Vol. II."

In conformity to the Act of the Congress of the United States, entitled "An Act for the encouragement of learning, by securing the copies of maps, charts and books, to the authors and proprietors of such copies, during the times therein mentioned:" and also to an act entitled, "An act supplementary to an act entitled, an act for the encouragement of learning, by securing the copies of maps, charts and books, to the authors and proprietors of such copies during the times therein mentioned; and extending the benefits thereof to the arts of designing, engraving and etching historical and other prints.

JOHN W. DAVIS, *Clerk of the District of Massachusetts.*

ADVERTISEMENT.

Upon presenting to the public the portion of this work, which completes one half of his labours, the author of the American Medical Botany feels himself bound to offer some report of the progress and prospects of his undertaking.

The plan of this work was formed and announced at a time when such a subject was wholly novel, and when coloured botanical engravings, from the difficulty and expense of their execution, were almost unknown in this country. It was endeavoured that the plan should be such as in some degree to insure, what both authors and their friends should desire, extensive circulation and permanent utility. An edition of a thousand copies was printed, and that the work might be generally accessible, the price was fixed at a lower rate, in proportion to the number of plates, than works of the kind have ever been placed at in this country; a rate which the probable sale of the whole edition could alone justify. As permanent utility was esteemed of more importance than ephemeral success, the work has not been hurried in any stage of its execution, even though some temporary advantages might have been obtained by its earlier appearance. The author has not willingly adopted the opinions of others in botany or medicine without examination, and has thought no delay injurious which might lead to the establishment of truth or the detection of error. He has been desirous, in adding the results of his own experience, that the book should have, in some degree at

least, the character of an original work, rather than of a compilation; at the same time that it should present a fair view of what is known on the subjects of which it treats. The figures of the plants have, in every instance, been made from original drawings, which were executed by himself, with the exception of two or three presented by his friends. The style of engraving is wholly new in this country, and is one which has been successfully attempted only by the first artists in France.

It gives him pleasure to state, that the reception of the work, in all parts of the United States, has exceeded his anticipations, that the subscription is already more than sufficient to defray the expense of publishing, and that its regular increase renders it probable that the whole edition will be taken up at an early period.

He avails himself of this occasion to return his acknowledgments to those correspondents who have obligingly assisted him by the communication of specimens for the work, and of the results of their own researches and experience. Particularly he would express this remembrance to ZACCHEUS COLLINS Esq. of Philadelphia, a gentleman whose active kindness has repeatedly supplied his botanical necessities; and whose extensive erudition has enabled him to afford counsel, which would not have been sought at a less respectable source. To Professor IVES of New Haven, a zealous and intelligent cultivator of the American Materia Medica, he would express the obligations derived from his communications and correspondence. It would be unjust to forget that many medicinal plants of the Southern States, with observations on their properties, were furnished expressly for this work, by the late Dr. JAMES MACBRIDE of Charleston, S. C. a

physician and a botanist, whose premature death has terminated a career of honourable usefulness and of active, liberal and efficient prosecution of science. His friends cannot remember without regret a man, who had the rare quality of being learned without ostentation, who was ambitious of usefulness more than of fame, and who sought rather to be valuable to others than just to himself.

As the materials for the rest of the American Medical Botany are now principally collected, and most of the drawings finished; the remaining numbers will be issued with as much promptness and regularity, as is consistent with their faithful execution.

PREFACE

TO THE SECOND VOLUME.

As frequent use is made in these pages of observations drawn from the auxiliary sciences, as affording some light on the medicinal properties of plants, it may be proper to examine how far testimony of this kind is entitled to receive credit in our inquiries and examinations.

There can be no question, that the actual operation of medicines upon the human system, gathered from positive experience, is, in the present state of our knowledge, the only criterion by which we can pronounce, with universal certainty, on their properties. There are nevertheless many things to be learnt from chemical analysis, sensible qualities, and botanical affinity, which may afford us, in some instances certainty, and in most others presumptive evidence of the medicinal characters of vegetables. The correspondence in these respects is frequently so striking, that we can hardly resist the belief, that an entire harmony of properties exists, which, if we are unable

fully to comprehend, it is rather owing to the imperfection of science, than to the irregularity of nature.

A few illustrations of this point, taken from general facts already ascertained, will place the subject in a clearer light.

The chemical substances, known by the names of *Gum Mucus* and *Fæcula*, are constantly emollient, demulcent, and nutritious. They manifest these qualities even when extracted from acrid and poisonous vegetables, as in Arum, Calla, and Jatropha.

Sugar is nutritious and demulcent. When subjected to a spontaneous chemical change by the vinous fermentation, it is universally a strong diffusible stimulus.

Fixed oils are emollient and laxative. Also nutritious.

Volatile oils on the contrary are acrid, stimulating, heating, and antispasmodic.

Tannin and the *Gallic* acid are uniformly antiseptic and powerfully astringent.

The *Acetous, Citric, Tartaric* and similar vegetable *acids* are refrigerant and antiseptic.

Bitter *Extractive* substances are usually tonic.

Resins, which are bitter and acrid, are commonly cathartic.

Emetine, as separated by Pelletier and Magendie, is powerfully emetic.

Morphium, obtained by Serturner, is a very strong narcotic.

The foregoing are some of the examples, which the present state of Chemistry allows us to observe of affinity between chemical and medicinal characters. With a few exceptions they will be found to be strictly true. Yet the analysis of vegetables is at present but imperfectly known, and an extended investigation is continually bringing new principles to light. We can hardly expect that the business of generalization should be attempted with complete success, until the constituent facts are better understood. From what we already know, however, it is not chimerical to predict, that if the chemistry of vegetables were as perfectly known in all its parts, as in those which we have detailed; their medicinal properties might be inferred, with at least as great certainty, as that which now attends most inferences in the conjectural science of medicine.

In regard to the botanical affinities of plants, as affording evidence of their medicinal powers, much has been said and written. Petiver, Hoffman, Linnæus, Hasselquist, and recently the learned Professor Decandolle have bestowed much

investigation on this subject. It is regarded as a desideratum by all, and as the consummation of botanical science by many, that plants should be so arranged, as that their assemblages should agree, not only in external forms, but in internal qualities and operative powers. Certain general agreements of this kind evidently prevail throughout nature; yet they are so varied, and subject to so many exceptions, that it is difficult to establish them by general scientific descriptions, and when they are rendered too minute they seem to lose much of their importance. It is perhaps as easy to know the properties of plants from their external habit, as to understand the characters of mankind from their physiognomy. Accurate observers know more than they can communicate the means of knowing to others, yet the most accurate are liable to be mistaken. Many vegetables of the closest affinity and resemblance, even species of the same genus, differ wholly from each other in their effects. Witness the species of Cucumis, Convolvulus, and Solanum, some of which are salutary, and others highly deleterious. Nevertheless there are many general truths, or at least general probabilities, by which every one would be influenced, and which have so much importance, that they will never be forgotten.

No botanist, even if in danger of starving in a wilderness, would indulge his hunger on a root or fruit taken from an unknown plant of the natural order *Luridæ*, of the *Multisiliquæ*, or the *umbelliferous aquatics*. On the contrary, he would not feel a moment's hesitation in regard to any of the *Gramina*, the fruit of the *Pomaceæ*, and several other natural families of plants, which are known to be uniformly innocent in their effects.

The *sensible properties* of plants afford another clue to their influence on the human system. It is true, that observations derived from this source will not serve us in forming very minute distinctions. They are, however, almost always adequate in vegetable productions, to enable us to distinguish what is innocent and salubrious, from what is noxious and virulent. The brute creation depend wholly upon the powers of sense in selecting their food, and this reliance does not often betray them. In regard to mankind it almost uniformly happens, that what is sweet, delicious, or aromatic, proves nutritive or salutary; while on the other hand, vegetable poisons are nauseous, acrid, and disgusting. It has been observed, that it would have been a sort of treachery in nature to have made it otherwise. Considering the universal dissemination of poisonous plants, and the

number of them, which frequent the vicinity of human habitations, this arrangement of Providence, by making ungrateful what is dangerous, has furnished almost the only safeguard from harm, to the inexperienced and unwary.

These remarks have been offered on account of an impression which many persons entertain, that collateral evidences of the characters of plants are worthless and undeserving of attention. Even if the community were composed exclusively of physicians, such an opinion could not be wholly correct. Every one may be called on to form hasty decisions on subjects where his experience is deficient, and where an acquaintance with auxiliary facts might lead him to a correct issue. It is not only curious and instructive to perceive the harmonies of nature, but to every inquirer among her works it must be practically useful. It can no where be more useful, or more deserving of study, than in a new country, where the face of nature presents an ungathered harvest, and where every clue to useful discovery derives importance from its influence and tendency.

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Pyrola umbellata

AMERICAN

MEDICAL BOTANY.

PYROLA UMBELLATA.

Winter Green.

PLATE XXI.

THIS most beautiful of the species of Pyrola is extensively diffused throughout the northern hemisphere. It inhabits all latitudes in the United States, and extends across the continent to the shores of the Pacific ocean. It is also found in the forests of Siberia, and in several of the northern and temperate countries of Europe. It only grows in shady woods, where it is protected from the sun, and nourished by the peculiar soil formed from the decomposition of leaves and wood. The most common appellations, by which it is known in the United States, are *Winter green* and *Pipsissewa.* It flowers in June and July, being somewhat later than most of the other species of its family.

By Pursh and some other American botanists, this species and one other have been separated from the genus Pyrola, to constitute a new family by the name of Chimaphila. As the grounds of distinction, however, between them are not sufficient to render it certain that this genus will ultimately stand; I have preferred retaining the original Linnæan name.*

* It is somewhat remarkable, that the genus Chimaphila was first established upon characters, which hardly exist in either of the plants it is intended to comprehend. The principal grounds of distinction, suggested by Michaux and adopted by Pursh, seem to consist in a *sessile stigma*, and anthers opening by a *subbivalve foramen*. Now the stigma is not sessile, since that term implies the absence of a style, and the anthers do not open by any subbivalve foramen, differing from the rest, but by two tubular pores, precisely as in the other species of Pyrola. Mr. Nuttall, in his interesting work on North American genera, has amended the character of Chimaphila, by bringing into view the calyx, filaments, &c. while he has added to the characteristics of Pyrola, a downy connexion of the valves of the capsule. In the calyx, however, the two species of Chimaphila are at different extremes from each other; one of them having a five leaved calyx, the leaves overlaying each other at base; the other having a five toothed calyx only, while the remaining species of Pyrola, being five parted, come between them. I have not been able to find the *tomentum* spoken of by Mr. Nuttall, in all the spiked species, and particularly in P. secunda.

If the genus Pyrola were ever to be dismembered, it should be into at least four distinct genera, as follows;

1. *Style declined, stigma annulate.*

P. rotundifolia, P. asarifolia, &c.

The genus Pyrola belongs to the class *Decandria*, and order *Monogynia*. It ranks among

2. *Style straight, stigma peltate.*
P. secunda, P. uniflora, &c.
3. *Style incrassated, calyx five leaved.*
P. maculata.
4. *Style immersed, calyx five toothed.*
P. umbellata.

If we go farther and take into view the direction and form of the filaments, and the other parts of flower and fruit, with their various combinations; we shall have nearly as many genera as there are now species, since it is well known that many of the most important specific distinctions in this genus are taken from the fructification.

On these accounts there can be no doubt that the genus Pyrola had better remain entire. In habit it is certainly one of the most natural genera we possess. All the species are humble evergreens, growing in woods, with creeping roots, ascending stems, and nodding flowers. All of them have their leaves in irregular whorls, flower with reversed anthers, and retain their style until the fruit is ripe. In inflorescence, one is solitary, two somewhat corymbed, and the rest spiked. The leaves of P. secunda, umbellata and maculata are usually in two or more whorls; those of most others in one radical whorl or aggregate. One species is said to be leafless.

In the dissections accompanying the figure of P. umbellata I have endeavoured to represent the evident gradation of the style from the species in which it is longest, to that in which it is shortest. In the same plate are added some of the varieties of the calyx and stamens.

The following remark of Sir James Edward Smith, the learned president of the Linnæan society, is from Rees' Cyclopedia, *Art.* Pyrola. "We can by no means assent to the establishment of that able writer's *(Pursh's)* Genus Chimaphila, there being surely no diversity of habit to support it, nor any character but a difference in the length of the style; which the other species of Pyrola shew to afford admirable specific, but no generic distinctions.

the *Bicornes* of Linnæus and the *Ericæ* of Jussieu.

The generic character is as follows. *Calyx mostly five parted; petals five; anthers inverted, opening by two tubular pores; capsule five celled, five valved.*

The species *umbellata* has its *leaves wedge shaped and toothed, flowers somewhat umbelled, calyx five toothed, and style immersed.*

Its more minute description is as follows:

Root woody, creeping, sending up stems at various distances. The stems are ascending, somewhat angular, and marked with the scars of the former leaves The leaves grow in irregular whorls, of which there are from one to four. They are evergreen, coriaceous, on very short petioles, wedge shaped, subacute, serrate, smooth, shining, the lower surface somewhat paler. The flowers grow in a small corymb, on nodding peduncles, which are furnished with linear bractes about their middle. Calyx of five roundish subacute teeth or segments, much shorter than the corolla. Petals five, roundish, concave, spreading, cream coloured, with a tinge of purple at base. Stamens ten. Filaments sigmoid, the lower half fleshy, triangular, dilated, and slightly pubescent at the edges; the upper half filiform. Anthers

two celled, each cell opening by a short, round, tubular orifice, which points downward in the bud, but upward in the flower. Pollen white. Germ roundish, depressed, furrowed, obscurely five lobed, with a funnel shaped cavity at top. Style straight, half as long as the germ, inversely conical, inserted in the cavity of the germ, and concealed by the stigma. Stigma large peltate, convex, moist, obscurely five rayed. Capsules erect, depressed, five celled, five valved, the partitions from the middle of the valves. Seeds linear, chaffy, very numerous and minute.

This plant, like the other species of Pyrola, is very difficult to cultivate, when transplanted from its native soil; although it thrives luxuriantly in the shade and rich mould of the forests where it originates.

The leaves of Pyrola umbellata, when chewed, communicate to the mouth a taste which partakes of both sweet and bitter. The stalk and roots possess the same taste, combined with a moderate degree of pungency. A Dissertation "De Pyrola umbellata," published at Gottingen, by Dr. Wolf, in 1817, contains an elaborate chemical examination of this plant. As the result of his trials, this author concludes, that 100 parts of Pyrola umbellata contain about 18 of a bitter extractive princi-

ple, 2.04 of resin, 1.38 of tannin, a slight portion of gum, and the rest of fibrina and earthy salts. The resin is adhesive, brownish, readily soluble in ether and alkalis, burning with flame and a resinous odour, and leaving a white cinder.

From my own trials the quantity of resin in this plant appears to be very small. A saturated tincture of a deep brown colour does not give a precipitate on the first addition of water. It is only after some time standing, and partly perhaps from the evaporation of the alcohol, that a turbidness begins to appear in the solution. It is probable that spirit is a better menstruum than water for the soluble portions of this plant, although the latter is capable of extracting the greater part of its virtue.

The Pyrola umbellata, though scarcely known as a medicine until within a few years past, has at the present day acquired a reputation of considerable extent in the treatment of various diseases. Its popular celebrity seems to have originated in its application to the treatment of fever and rheumatism; but the attention of physicians has been chiefly drawn towards its use in other complaints. The instances in which this plant has received favourable testimonies on medical authority, of its successful use, both in America

and Europe, are principally the following. 1. As a palliative in strangury and nephritis. 2. As a diuretic in dropsy. 3. As an external stimulant, susceptible of useful application to various cases.

In the first of these cases, the Pyrola is entitled to attention and confidence. Some practitioners in this country have employed it with advantage in the same cases, in which the Arbutus Uva ursi is recommended*. Dr. Wolf, the German writer lately cited, has reported a number of cases of ischuria and dysuria, arising from various causes, in which the Pyrola, given in infusion, produced the most evident relief, and took precedence of a variety of remedies which had been tried. His method of administering it was to give a table spoonful of a strong infusion, with a little syrup, every hour. In all the cases he has detailed, small as the dose was, it gave relief in a very short time. In one case its effect was so distinctly marked, that the disease returned whenever the medicine was omitted and was removed on resuming its use. A tonic operation attended its other effects, so that the appetite was improved and digestion promoted during the period of its employment.

* See Dr. Mitchell's Inaugural Dissertation. Philadelphia, 1803.

The diuretic properties of the Pyrola umbellata, seem to have been fully illustrated by Dr. W. Somerville in a paper on this vegetable, published in the 5th volume of the London Medico-Chirurgical transactions. The facts presented by this physician afford satisfactory evidence of the power of this medicine to promote the renal excretion, and to afford relief to patients afflicted with dropsy in its various forms. The most distinguished case presented by him, is that of Sir James Craig, the British governour in Canada, who was labouring under a general dropsy, which in its progress had assumed the forms of hydrothorax, anasarca and ascites, and which was combined with different organic diseases, especially of the liver. After having tried with little or temporary success, almost every variety of diuretic and cathartic medicines, and submitted twice to the operation of tapping, the patient had recourse to a strong infusion of the Pyrola, in the quantity of a pint every twenty four hours. Although the case was altogether an unpromising one, yet the plant gave relief, not only in the first, but in the subsequent instances of its use. It increased the urinal discharge, and at the same time produced an augmentation of strength and an invigorated appetite.

Several other cases of dropsy are detailed in Dr. Somerville's paper, in which the Pyrola was administered by himself and by other practioners with decided advantage. Dr. Satterly and Dr. Marcet are among those who have added their observations to the testimonies in its favour. Dr. Somerville found his patients to remark, that an agreeable sensation was perceived in the stomach soon after taking the Pyrola, and that this was followed in some instances by an extraordinary increase of appetite. He considers it as having in this respect a great advantage over other diuretics, none of which are agreeable to the stomach, and most of them very offensive to it. He further states, that no circumstance had occurred within his own experience or information, to forbid its use in any form, or to limit the dose.

Dr. Wolf has given one very satisfactory case of the utility of our plant in ascites. He also found it to alleviate altogether the ardor urinæ attendant on gonorrhea.

Such are the most important facts which to my knowledge have been published respecting the internal use of the Pyrola umbellata. I have administered this plant on various occasions, and attended to its mode of operation. In a number of dropsical cases, when first given, it made a dis-

tinct and evident impression on the disease, communicating an increased activity to the absorbents, followed by a great augmentation of the excretion from the kidnies. The benefit, however, with me has been in most instances temporary, and it was found better to omit the medicine for a time and to resume it afresh, than to continue it until the system had become insensible to its stimulus. After suspending it for a week or two, the same distinct operation took place on returning to its use, as had been manifested in the first instance. It proved in almost every instance, a very acceptable medicine to the patient, and was preferred both for its sensible qualities and its effects on the stomach, to other diuretics and alteratives which had been prescribed.

The Pyrola has been considerably employed as an external application in tumours and ulcers of various descriptions. It first acquired notice in consequence of some newspaper attestations of its efficacy in the cure of cancer. Those persons who know how seldom genuine cancers occur in comparison with reputed ones, will be more ready to allow it the character of curing ulcerous, than really cancerous affections. There are undoubtedly many ulcers, and those frequently of a malignant kind, which are benefitted by antiseptic

stimulants ; and to such the Pyrola may be useful. But of its efficacy in real cancer we require more evidence than is at present possessed, before we ascribe to it the power of controlling so formidable a malady.

Dr. Miller of Franklin informs me that he has used a decoction and cataplasm of this plant with apparent success in various chronic indurated swellings. It acts as a topical stimulant, and when long continued, not unfrequently vesicates. Tumours of long standing have in several instances disappeared under its use.

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PLATE XXI.

Fig. 1. *Pyrola umbellata.*
Fig. 2. *Pistil of Pyrola rotundifolia.*
Fig. 3. *Pistil of Pyrola secunda.*
Fig. 4. *Pistil of Pyrola uniflora.*
Fig. 5. *Pistil of Pyrola maculata.*

Fig. 6. *Pistil of Pyrola umbellata.*

Fig. 7. *Section of the same, shewing the length of the style.*

Fig. 8. *Five toothed calyx of P. umbellata.*

Fig. 9. *Five leaved calyx and incrassated pedicel of P. maculata.*

Fig. 10. *Anther magnified of P. secunda.*

Fig. 11. *Ditto of P. rotundifolia.*

Fig. 12. *Stamen magnified of P. umbellata.*

Fig. 13. *Ditto of P. maculata.*

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Gaultheria procumbens.

GAULTHERIA PROCUMBENS.

Partridge Berry.

PLATE XXII.

There is no soil so inhospitable, that it does not afford the means of sustenance and growth to some vegetable tenant. The most arid and penurious spots of earth not only give support to a variety of plants, but they are even selected by certain species, which make them their permanent residence, and thrive better in the midst of poverty and drought than they could in the most fertile and luxuriant situations. The Gaultheria procumbens is one of those hardy and abstemious plants, which are better satisfied with the clear air of the mountains, than with a deep or mellow soil. It is found growing in large beds under the shade of shrubs and trees upon elevated tracts of ground, or upon the sand and gravel of the driest forests. Its bright evergreen leaves seem adapt-

ed for ready absorption and slow perspiration, so that it derives from the dews and rain, what the earth fails to supply it.

The Gaultheria procumbens is remarkable for the different periods of producing its flowers and fruit. It is found in blossom not only in the early part of spring, but in the last weeks of summer, and the fruit is found ripe at corresponding periods. Whether this appearance is the product of different shoots, or whether the same stems blossom twice in a year, I am unable to say. I have, however, met with beds of the Gaultheria in full flower in August and September, quite as frequently as in May. I have also seen the fruit in the market at various periods of the summer, fall, and spring.

The plant takes its vulgar names from the fruit, and is denominated in different parts of the United States, *Partridge berry*, *Chequer berry*, *Box berry*, &c. Its domestic use has also given it the name of *Mountain tea*.

The genus Gaultheria is beautifully singular and distinct in its character, derived from the form of its fruit. The *calyx is five cleft, calyculated, or bibracteate at base. Corolla ovate. Capsule five celled, invested with the baccated calyx.*

The species *procumbens* has a *prostrate stem with ascending branches. Leaves in a terminal tuft, obovate with a few ciliate serratures. Flowers axillary.*

Class *Decandria*, order *Monogynia*, Natural orders *Bicornes Linn.* *Ericæ Juss.*

The stem, or as it might be called root of this plant is horizontal, woody, often a quarter of an inch in thickness. The branches are ascending, but a few inches high, round and somewhat downy. Leaves scattered, near the extremities of the branches, evergreen, coriaceous, shining, oval or obovate, acute at both ends, revolute at the edge, and furnished with a few small serratures, each terminating in a bristle. Flowers axillary, drooping, on round downy stalks. Outer calyx of two concave, heart shaped leafets, which may with perhaps more propriety be called bractes. Inner calyx monophyllous, white, cleft into five roundish subacute segments. Corolla white, urceolate, five angled, contracted at the mouth, the border divided into five short, reflexed segments, Filaments white, hairy, bent in a semicircular manner to accommodate themselves to the cavity between the corolla and germ. Anthers oblong, orange coloured, ending in two double horns, bursting outwardly, for their whole length above the filaments,

and not opening by pores as in Pyrola. Pollen white. Germ roundish, depressed, five angled, resting on a reddish, ten toothed, glandular ring. Style erect, straight. Stigma simple, moist. The fruit is a small, five celled capsule, invested with the calyx, which becomes large, round, and fleshy, having the appearance of a bright scarlet berry.

If the aroma or odour and also the taste of plants were susceptible of description in as definite language as their proportions and form, the sensible qualities of many vegetables might afford new grounds for generalizing and combining them together. The aromatic flavour of the Partridge berry, which cannot easily be mistaken by those who have once tasted it, may be recognised in a variety of other plants, whose botanical habits are very dissimilar. It exists very exactly in some of the other species of the same genus, particularly in *Gaultheria hispidula ;* also in *Spiræa ulmaria* and the root of *Spiræa lobata.* It is particularly distinct in the bark of the Sweet birch, *Betula lenta*, one of our most useful and interesting trees.

This taste and odour reside in a volatile oil, which is easily separated by distillation. The essential oil of Gaultheria, which is often kept in our druggists' shops, is of a pale or greenish white

colour and perfectly transparent. It is one of the heaviest of the volatile oils, and sinks rapidly in water if a sufficient quantity be added to overcome the repulsion of two heterogeneous fluids. Its taste is aromatic, sweet and highly pungent.

The oil appears to contain the chief medicinal virtue of the plant, since I know of no case in which the leaves, deprived of their aroma, have been employed for any purpose. They are nevertheless considerably astringent, and exhibit the usual evidences of this property when combined with preparations of iron.

The berries, or berry-like calyces, have a pulpy but rather dry consistence, and a strong flavour of the plant. They are esteemed by some persons, but are hardly palatable enough to be considered esculent. In the colder seasons they afford food to the partridges and some other wild animals.

The leaves, the essence and the oil of this plant are kept for use in the apothecaries' shops. An infusion of the leaves has been used to communicate an agreeable flavour to tea, also as a substitute for that article by people in the country. Some physicians have prescribed it medicinally as an emmenagogue, with success in cases attended with debility. The oil, though somewhat less pungent than those of peppermint and origanum, is

employed for the same purposes. It shares with them the property of diminishing the sensibility of the nerve exposed by a carious tooth, when repeatedly applied. The essence, consisting of the volatile oil dissolved in alcohol or proof spirit, is antispasmodic and diaphoretic, and may be applied in all cases where warm or cordial stimulants are indicated. A tincture, formed by digesting the leaves in spirit, possesses the astringency as well as warmth of the plant, and has been usefully employed in diarrhæa.

A respectable physician of Boston informs me, that he has in various instances found the infusion of this plant very effectual in promoting the mammary secretion, when deficient; and even in restoring that important function after it had been for some time suspended. Whether the medicine has any specific influence of this sort, independent of the general state of the patient's health, I am not prepared to say.

BOTANICAL REFERENCES.

Gaultheria procumbens, Linn. *Sp. pl.*—Michaux, *Flor.* i. p. 249.—Pursh, i. 283.—Nuttall, *Gen.* i. 263.—Andrews, *Bot. Repository*, *t.* 116.—Willd. *Arb.* 123.—Vitis Idæa Canadensis Pyrolæ folio, Tournefort, *Inst.* 608.—Anonyma pedunculis arcuatis, Colden, *Noveb.* 98.

MEDICAL REFERENCES.

KALM, *Amœnitates Academicæ*, iii. 14.—BART. *Coll.* i. 19.

PLATE XXII.

Fig. 1. *Gaultheria procumbens.*

Fig. 2. *The bractes or outer calyx.*

Fig. 3. *The true calyx.*

Fig. 4. *Stamen of the natural size.*

Fig. 5. *Anther magnified, the dark places shewing the mode of opening.*

Fig. 6. *Calyx and pistil.*

Fig. 7. *Fruit.*

Fig. 8. *Longitudinal section of the fruit.*

Fig. 9. *Transverse section of the capsule.*

PODOPHYLLUM PELTATUM.

May Apple.

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PLATE XXIII.

THE *Podophyllum peltatum* or *May apple*, otherwise called *Mandrake* in this country, inhabits low shady situations from New England to Georgia. On the Atlantic coast I have never met with it farther north than Boston, yet in the interior of the country it has a more extensive range. From its large creeping roots, it has a great tendency to multiply, and is always found in beds of greater or less extent. Its flowering time is from March to May.

This plant is one of the *Ranunculaceæ* of Jussieu and *Rhœades* of Linnæus; and is in the first order of the Class *Polyandria.*

Its generic character consists in a *calyx* of *three leaves; from six to nine petals; and a one-celled berry crowned with the stigma.* Only one spe-

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Podophyllum peltatum

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cies is at present known which strictly belongs to the genus.

The May apple has a jointed running root about half the size of the finger, by which it spreads extensively in rich grounds, where it gets introduced. The stem is about a foot in height, and invested at its base by the sheaths which covered it when in bud. It is smooth, round and erect, dividing at top into two round petioles from three to six inches long. Each petiole supports a large peltate, palmate leaf, smooth above, slightly pubescent beneath, deeply divided into about seven lobes, which are wedge shaped, two parted and toothed at the extremity. On the inside the leaf is cleft almost to the petiole. In barren stems which support but one leaf this does not take place, and the leaf is very perfectly peltate. In the fork of the stem is a solitary flower on a round nodding peduncle one or two inches long. Calyx of three oval, obtuse, concave leaves, cohering in the bud by their scarious margins, and breaking off at base when the flower expands. Petals from six to nine. Linnæus makes them nine in his generic character, but in this climate I have found them more frequently seven even in luxuriant specimens growing in very rich soil. They are obovate, obtuse, concave, smooth, white with slight

transparent veins. Stamens shorter than the petals, curving upwards ; the anthers oblong, twice as long as their filaments. Germ oval, compressed, obscurely angular. Stigma nearly sessile, convex, its surface rendered irregular by numerous convolutions and folds. The flower is succeeded by a large ovate yellowish fruit, which is one celled, many seeded and crowned with the stigma. Its early period of ripening has given rise to the trivial name of *May apple.*

The dried root of the May apple is fragile and easily reduced to powder. It has a peculiar and rather unpleasant taste, but without much acrimony. When chewed for some time, it manifests a strong bitter taste. Both the tincture and decoction are intensely bitter. When water is added to the alcoholic solution the mixture becomes very gradually turbid, and at length opaque. On the other hand, alcohol disturbs both the infusion and decoction, especially the latter, in which it produces, after some time, a pearly whiteness. The trials I have made with it lead me to conclude that it contains a resin, a bitter extractive matter, fæcula and a slight proportion of a gummy substance.

The medicinal properties of the Podophyllum peltatum are those of a sure and active cathartic,

in which character it deserves a high rank among our indigenous productions. We have hardly any native plant which answers better the common purposes of jalap, aloes and rhubarb, and which is more safe and mild in its operation. The root is the part to be employed, and should be given in substance in fine powder. I have commonly found twenty grains to operate with efficacy, and not to be attended with pain or inconvenience. In irritable stomachs it sometimes occasions nausea and vomiting, but this effect, as is well known, may ensue from any cathartic medicine. The late Professor Barton informs us, that although the root is an excellent cathartic, the leaves are poisonous, and the whole plant has something of a narcotic quality. Its botanical affinities would justify, *a priori*, a suspicion of this kind. In the various trials which I have made with it, I have not observed any such property in the root. The leaves I have never subjected to experiment for any purpose.

The fruit is acid and agreeable to the taste of many persons. It is sometimes called *wild lemons*, and is eaten with impunity.

The root is said by some physicians to be a medicine particularly suited to dropsy. It has

also had the character in the Southern States of curing intermittent fever.

A physician in Albany informs me that the Shakers at Lebanon, N. Y. prepare an extract of the Podophyllum, which is much esteemed by medical practitioners as a mild cathartic. These people are well known to our druggists by the care and neatness with which they prepare a variety of medicines from native and naturalized pharmaceutical plants.

For medicinal use the root of the May apple is advised to be dug in the cold season, when vegetation is not active, viz. in the autumn and winter. At this part of the year the secretions of perennial plants are concentrated in their roots, and the same weight of their substance is less diluted with the watery or ascending sap, than it is at any other period. This constitutes a reason why the roots of all perennial plants should, as far as practicable, be taken up during the cold season. But from what I have been able to observe, the difference of their virtue in different months is much less than is commonly supposed. I never knew a medicinal plant whose efficacy was destroyed in consequence of being taken up even at midsummer, although it may be in some degree lessened. It is probable that those roots

which constitute staple articles of commerce, as ipecac, gentian, rhubarb, &c. are gathered indiscriminately for exportation at all seasons when they are to be found. Being collected by savages or by ignorant persons, who seek for them in their native wilds, and who are not much interested in their future efficacy; it is probable they would be gathered in greatest quantities when their vegetation was most luxuriant, because at this time their shoots and tops would be most conspicuous. We know this to be the case with our Ginseng, Spigelia, Snake root, &c. which form considerable articles of exportation, and which it would be difficult to find at any other than the vegetating season.*

* *Annual plants* should be gathered at the time when their vegetation is most vigorous, which is generally from the time they begin to flower, until the leaves begin to change. The leaves contain the greatest activity in most annual plants employed for medicine, while the root is a comparatively insignificant part, being small, woody and fibrous. Thus the leaves of Stramonium and Tobacco are much more active than the root.

Biennial plants should, in most instances, be gathered in the second season of their growth, and about the time of flowering. The leaves of these plants also contain their medicinal activity, as in Hemlock and Henbane. The roots are medicinal, but usually in a less degree. In some aromatic biennials, the seeds are the most important part of the plant.

BOTANICAL REFERENCES.

Podophyllum peltatum, LINN. *Sp. pl.*—MICHAUX, *Flora*, i. 309.—PURSH, ii. 366.—LAMARCK, *Illust. gen.*—TREW, *Ehret. t.* 29.—Anapodophyllum Canadense, CATESBY, *Car.* i. 24.—Aconitifolius humilis &c. MENTZ. *pug. t.* 11.

MEDICAL REFERENCES.

SCHŒPF, 86 —B. S. BARTON, *edit. of Cullen*, 375.—THACHER, *Disp.* 307.—CHAPMAN, *Mat. Med.* 209.

PLATE XXIII.

Fig. 1. *Podophyllum peltatum.*
Fig. 2. *Calyx.*
Fig. 3. *Stamens.*
Fig. 4. *Germ and stigma.*
Fig. 5. *Fruit.*

PL.XXIV.

Solanum fœtidum

ICTODES FŒTIDUS.

Skunk Cabbage.

PLATE XXIV.

THIS is one of our most noticeable plants, both from the frequency of its occurrence and the peculiarity of its sensible properties. Scarcely a swamp or meadow is found in the middle and northern parts of the United States in which this vegetable may not be discovered at a distance, especially in the spring season, by its large tufts of rank, crowded leaves. Its singular flowers are among the first which break from the ground, after the rigours of winter, appearing in different latitudes, from February to April. The vegetation is rapid, so that in most instances the fruit is ripe and the leaves wholly decayed before the end of August. From this precocity of the plant together with the depth to which the roots penetrate the earth, it seems calculated to bear the

cold of high latitudes. I have found the flowers a second time formed, and shooting from the ground in November. The strong and unpleasant odour which every part of the plant emits on being broken, and which is precisely similar to that of the *Viverra mephitis;* has given it by an almost common consent, in every part of the country, the appellations of *Skunk weed* and *Skunk cabbage.*

The structure of this singular vegetable has caused it successively to be assigned to the genera *Arum*, *Dracontium* and *Pothos*, with none of which it fully agrees. Of the Aroideæ, to which it is related, it approaches most nearly in its flower to *Pothos;* while its fruit has more affinity to *Orontium.* The Rev. Dr. Cutler many years ago, in the Transactions of the American Academy, pointed out the distinctive characters of this plant, and pronounced it a new genus. No name, however, substantiated by a character, has to my knowledge been given it, in any botanical work, except the name of *Symplocarpus*, a term lately adopted by some American botanists on the alleged authority of Mr. Salisbury. As this name by its etymology implies a resemblance of the fruit to *Symplocos*, a genus with which the plant has not the least affinity; it appears to me inadmissible. Although I am averse to multiply the confusion

of synonyms, with which our science is already too much burdened, yet in the present instance an appropriate name, which should not be at variance with the character of the plant, appeared to be required. With the advice of the venerable Dr. Cutler, I have translated, as nearly as possible, the common English appellation for the plant. The name *Ictodes* from *ἴκτις*, *viverra*, and *οζω*, *oleo*; is sufficiently expressive of the property from which its common name is derived.

The genus Ictodes has for its character a *hooded spathe, spadix covered with perfect flowers, calyx with four segments, petals none, style pyramidal, seeds immersed in the spadix.* Only the present plant can be assigned to this genus. It belongs to *Tetrandria, monogynia*; and is found among the *Piperitæ* of Linnæus and *Aroideæ* of Jussieu. The root is large and abrupt, with numerous, crowded, fleshy fibres. The spathe which emerges from the ground some time before the leaves, is ovate, swelling, various in width, cucullate, spotted and sometimes nearly covered with dull brownish purple, the top acuminate and incurved, the edges infolded, auriculate at base, and at length coalescing. Within this is the oval spadix, on a short peduncle, covered with perfect tetrandrous flowers, and of the same colour with

the spathe. Calyx leaves four, fleshy, wedge shaped, truncate, the top and edges inflected, the whole crowded together so as to form a compact covering for the spadix. Stamens four, opposite the calyx leaves, with subulate filaments equal in length to the calyx, and oblong four celled anthers. Style four sided, tapering; stigma minute, pubescent; germ roundish, concealed within the spadix. After the spathe decays, the spadix continues to grow, and with it every part of the flowers except the anthers. When the fruit is ripe, the spadix has attained many times its original dimensions, while the calyx, filaments and style are larger, very prominent and separated from each other. Within the spadix at the base of each style is a round, fleshy seed, as large as a pea, white, tinged with green and purple, invested with a separate membranous coat, and with a prominent corculum situated in a depression at top.

The leaves which spring up some time after the flowers are numerous, large and crowded, oblong heart shaped, acute, smooth, with numerous fleshy veins of a paler colour. They spring from the root on long petioles, hollowed in front, and furnished with large oblong sheaths. They continue to increase in size for a month or two after the flowering period is past.

Mr. Nuttall, who has observed the germination of this plant, informs us that the seed does not appear to possesss any other cotyledon, than a sheathing stipule, similar to that which is afterwards produced in the plant. The principle bulk of the seed is formed by what he considers a vitellus, having the embryo exactly resembling the future plant, situated in an umbilical depression at its top. The attachment of this body to the embryo is at first by a minute *funiculus*, which enlarges and becomes more distinct during the progress of germination; but the most singular circumstance respecting it is the length of time for which it continues attached to the growing plant, apparently inert at the base of the candex for twelve or even eighteen months.

The offensive and powerful odour which characterizes this plant is not peculiar to it. The fruit of some of the North American currants, and particularly *Ribes rigens* of Michaux, a species often met with on the high mountains of the Eastern States; emits when bruised a scent exactly similar to this vegetable.

The odour of the Ictodes resides in a principle which is extremely volatile. I have not been able to separate it by distillation from any part of the plant, the decoction and the distilled water be-

ing in my experiments but slightly impregnated with its sensible character. Alcohol, digested on the plant, retains its odour for a time, but this is soon dissipated by exposure to the air.

An acrid principle exists in the root even when perfectly dry, producing an effect like that of the Arum and Ranunculi. When chewed in the mouth, the root is slow in manifesting its peculiar taste; but after some moments, a pricking sensation is felt, which soon amounts to a disagreeable smarting, and continues for some time. This acrimony is readily dissipated by heat. The decoction retains none of it. The distilled water is impregnated with it, if the process be carefully conducted, but loses it on standing a short time.

A resinous substance is dislodged from the alcoholic solution of the root by the addition of water, the solution becoming moderately turbid. A gummy or mucous principle is also present, and fills the mouth with mucilage when the root is chewed. It is separated from the decoction in small *flocculi* when alcohol is added.

The spadix consists of a fleshy cellular substance, which shrinks very much in drying. The seeds when dry are reduced to half their former size, and in this state they have a tough waxy

consistence and an animal odour. They contain fixed oil in abundance, which is easily forced out from them by expression. Their principal bulk appears to be albumen, and when reduced to powder they are less easily soluble in boiling water, than grains which are less oleaginous. They burn with an oily smoke, leaving behind a large coal.

The sensible properties of the Ictodes having a strong affinity with those of assafœtida and the other fœtid gums, practitioners have been led to expect from it a similar antispasmodic power. Experience has justified these expectations in a variety of disorders of the spasmodic and nervous kind. The Rev. Dr. Cutler of Massachusetts was the first who recommended its use in asthmatic cases. In his account of indigenous American vegetables, he tells us that the roots dried and powdered form an excellent remedy in asthma, and often give relief when other means prove ineffectual. It may be given, he says, with safety to children as well as adults; to the former in doses of four, five or six grains, and to the latter in doses of twenty grains and upward. In a private letter he states, that he made use of it in his own case of asthma for several years, and generally found relief. In the winter he used the dried

root in powder, and in summer, the fresh grated root. It continued to afford more relief than any other remedy, so long as the paroxysms remained under the influence of any medicine. Since the recommendation of Dr. Cutler, many country physicians have employed the root in asthma, catarrh and chronic coughs, with evident benefit. A number of cases have fallen under my own observation of the catarrh affections of old people, in which a syrup prepared from the root in substance has alleviated and removed the complaint. Dr. Thacher informs us on various authorities, that the powdered root has given immediate relief in hysteric paroxysm, that it has affected the cure of dropsy, and that rheumatic patients have found great benefit from its use. Its strong and penetrating acrimony would lead us, *a priori*, to expect advantage from it in these complaints. Even in the more formidable disease of epilepsy, it has appeared to do good.

Some caution, however, is requisite in its management, as serious inconvenience may ensue from an over dose. In delicate stomachs I have found it frequently to occasion vomiting even in a small quantity. In several cases of gastrodynia where it was given with a view to its antispasmodic effect, it was ejected from the stomach

more speedily than common cathartic medicines. I have known it in a dose of thirty grains to bring on not only vomiting, but headach, vertigo and temporary blindness. Other practitioners have given it in larger quantities without any evil of this kind, but I think such an exemption must be attributed to the age and deteriorated quality of the root. Its active ingredients being more or less volatile, it must necessarily be impaired in strength by long keeping, especially in a pulverized state.

To insure a tolerably uniform activity of this medicine, the root should be kept in dried slices and not reduced to powder until it is wanted for use. It may then be taken in pills or mixed with syrup in doses of from ten to twenty grains. These may in most instances be repeated three times a day.

BOTANICAL REFERENCES.

Arum Americanum, CATESBY, *Car.* ii. *t.* 71.—Dracontium fœtidum, LIN. *Syst. pl.*—WILLD. ii. 288.—Pothos fœtida, MICHAUX, *Amer.* ii. 186.—PURSH, ii. 398.—*Bot. Mag.* 836.—Symplocarpus fœtida, NUTTALL, *genera*, i. 105.

MEDICAL REFERENCES.

CUTLER, *Trans. Amer. Acad.* i. 407. THACHER, *Dispensatory*, 150.

MISSOURI BOTANICAL GARDEN.

PLATE XXIV.

Fig. 1. *Ictodes fœtidus in flower, the spathe inclosing the spadix.*
Fig. 2. *The spadix taken out of the spathe.*
Fig. 3. *The leaves, stalks, &c.*
Fig. 4. *The spadix in fruit, one quarter being cut away to show the seeds.*
Fig. 5. *A flower magnified.*
Fig. 6. *The same opened.*
Fig. 7. *Petal and Stamen.*
Fig. 8. *Style.*
Fig. 9, 10. *Seeds.*

Statice *caroliniana*

STATICE CAROLINIANA.

Marsh Rosemary.

PLATE XXV.

THE class of vegetables, denominated maritime, or sea shore plants, are constituted to occupy extensive tracts of ground, which, from their impregnation with sea salt, are incapable of sustaining the life and growth of other species. The muriate of soda, if poured at the roots of the most vigorous plants belonging to a fresh soil, will often destroy them in a short time. Few forest trees of the temperate zones can grow in marshes where their roots are wholly exposed to the access of salt water. Yet such is the wise arrangement of nature, that this substance, which proves a poison to most vegetables, is converted into the food and necessary stimulus of the rest. Maritime plants flourish alike in places visited by the tide, and those im-

pregnated by the salt springs of the interior. The degree in which they require the presence of the mineral is various, some growing upon the beach, where the earth is saturated with salt, and others at the extreme edge of marshes, where the impregnation is much less powerful. With a few exceptions, they cannot long be cultivated in fresh earth, but soon decay when removed from their native marshes.

Maritime plants derive a peculiar character from their place of growth, which distinguishes them even when dry from other vegetables. The salt with which they are impregnated crystallizes on their surface in dry weather; and deliquesces so as to render them damp and supple, when the atmosphere is moist. These plants are troublesome in an herbarium from the facility with which they contract moisture from the atmosphere, and communicate it to the adjacent papers. The hay cut upon salt marshes often becomes extremely damp, and would be entirely spoiled, were it not for the antiseptic and preservative quality of the salt. The barilla of commerce is obtained by the combustion of maritime vegetables.

Many of these plants are thick and fleshy in their mode of growth, and differ remarkably in this respect from their co-species on dry ground. This is

particularly seen in Arenaria, Gerardia, Chenopodium, &c.

The vegetable which is the subject of this article is exclusively a maritime plant. It is one of the few ornamental species in our salt marshes, and is very conspicuous for its purple tops appearing among the grass in all the summer months. It varies from a few inches, to a foot and more in height.

This species has generally been considered a variety of the *Statice limonium*, which is a common plant in the salt marshes of Europe. Indeed, several of the maritime species of this genus approach each other so closely in their characters, that they have been considered the same by able botanists. The American plant, to which the name of *Caroliniana* was given by Walter in his Flora of Carolina, is distinguished from the European principally by its smaller flowers and plain or flat leaves. From the *Statice Gmelini*, an Asiatic species, it differs apparently still less in its general form.

The genus *Statice* belongs to the class *Pentandria* and order *Pentagynia*. Its natural orders are *Aggregatæ* of Linnæus and *Plumbagines* of Jussieu. It is characterized by *a calyx monophyllous, plaited* and *scarious. Petals five with*

the stamens inserted in their claws. Seed one, invested with the calyx. The species *Caroliniana* has its *scape round* and *panicled; its leaves obovate-lanceolate, smooth, obtuse, mucronated, and flat on the margin.*

The root of this plant is perennial, large, fleshy, fusiform or branched. Several tufts of leaves and scapes are often produced from the same root. The leaves are narrow-obovate, supported by long petioles, smooth, veinless, obtuse, mucronated by the prolongation of the middle rib, level and flat on the margin, in which respect they differ from S. limonium, which is undulated. Scape round, smooth, furnished with a few scales, flexuous at top, giving off numerous branches, which end in spikes of flowers; the whole forming a large panicle. The base of each branch and flower is supported by an ovate, mucronated scale. The flowers are alternate, erect, consequently one sided in the horizontal branches; mostly in pairs, but appearing single from one expanding before the other. They grow on a short, forked peduncle, which is concealed by several sheathing scales, part of which are common to the two, and part peculiar to the upper one. The calyx is funnel shaped, five angled, the angles ciliate and ending in long acute teeth with sometimes, not al-

ways, minute intermediate teeth. The upper part of the calyx is scarious and of a pink colour. Petals spatulate, obtuse, longer than the calyx, pale bluish purple. Stamens inserted in the claws of the petals, anthers heart shaped. Germ small, obovate, with five ascending styles shorter than the stamens. Seed oblong, invested with the persistent calyx.

The root, which is the officinal part of the Marsh Rosemary, is one of the most intense and powerful astringents in the vegetable materia medica. It communicates to the mouth an highly austere and astringent taste, combined with a good deal of bitterness. Few vegetable substances, when chemically treated, give more distinct and copious evidence of the presence of both tannin and gallic acid. The sulphate of iron strikes a fine purple colour with the solution, and soon deposits a precipitate, which, on exposure to the air, becomes of an inky blackness. Gelatin also throws down a copious, whitish, insoluble precipitate. Resin hardly exists in this root, nor any thing else exclusively soluble in alcohol. The impregnation with sea salt is readily made obvious.

Dr. Mott, Professor of Surgery in the University of New York, has published an interesting

and valuable investigation of the properties of this plant in 1806. He informs us that the astringency, indicated by the sulphate of iron, was greater in the tincture than in the infusion under experiments precisely similar; from which it may be inferred, that alcohol is a better solvent for this root than water. He also found the cold infusion more powerful than the hot, a circumstance probably to be accounted for by the escape of a part of the gallic acid by evaporation. The astringency was found fully equal to that of galls, and ink made from equal quantities of the two, similarly treated, was equal in blackness.

The Statice Caroliniana possesses much medicinal reputation as an astringent, and large quantities of it are annually consumed in different parts of the United States. In Boston it is regularly kept by the druggists, and larger quantities are sold, than of almost any indigenous article. It is principally sought for as a topical remedy in aphthæ and other ulcerative affections of the mouth and fauces. From its astringent and antiseptic quality, it is peculiarly suited to correct the state of these local maladies, and its application is commonly followed with success. It is much better suited to such complaints than the Coptis trifolia or gold thread, with which it is

frequently combined, and which is only a tonic bitter without astringency.

Dr. Baylies of Dighton, Mass. employed a decoction of the root, both internally and externally, in the Cynanche maligna, a disease which has at times been epidemic and very destructive in different parts of our country. It proved very successful not only under his own observation, but under that of other physicians in this dangerous complaint.

Dr. Mott informs us, that in the chronic stages of dysentery, after the inflammatory diathesis, great tenesmus, &c. are removed; a strong decoction of the root has restored patients to health, after various tonics and astringents had been used to no effect.

BOTANICAL REFERENCES.

Statice Caroliniana, WALTER, *Flora Car.* 118.—PURSH, i. 212.—NUTTALL, i. 206.—Statice limonium, MUHLENBERG, *Catalogue*, 33.—ELLIOTT, *Carolina*, i. 374.

MEDICAL REFERENCES.

MOTT, *Inaugural Dissertation.*—THACHER, *Disp.* 345.—BAYLIES, *Papers of the Mass. Med. Society*, vol. i.

PLATE XXV.

Fig. 1. *Statice Caroliniana.*
Fig. 2. *A flower magnified.*
Fig. 3. *Calyx ditto.*
Fig. 4. *A petal and stamen ditto.*
Fig. 5. *Germ and styles ditto.*

XXIV.

. Isolepias tuberosa

ASCLEPIAS TUBEROSA.

Butterfly Weed.

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PLATE XXVI.

FEW genera are more curious and intricate in their structure, than that to which our present article belongs. The plants which constitute the family of Asclepias are so peculiar in their habit, that they are easily recognized even by the inexperienced botanist, while their minute structure is so complicated, as to require not a little attention for its perfect development. This fine race of plants are so abundant in the United States, that every month of the summer season presents us a number of beautiful species. By far the most rich and gaudy of these in appearance is the Asclepias tuberosa, known by the vulgar names of *Butterfly weed* and *Pleurisy root*, and found in dry, sandy soils, pine woods, &c. from Massachu-

setts to Georgia. It is the Asclepias decumbens of Walter.

This genus has a *five parted calyx; a five parted reflexed corolla; a nectary of five erect, cucullate leaves, each producing an inflected horn from its cavity; stamens united, with ten pollen masses hanging by pairs in their cavities.* The species *tuberosa* is *hairy, its leaves alternate, oblong-lanceolate; its branches cymose.*

Class *Pentandria*, order *Digynia.* Natural orders *Contortæ*, L. *Apocineæ*, Juss.

The root of this plant is large, fleshy, branching, and often somewhat fusiform. It is only by comparison with the other species that it can be called tuberous. The stems are numerous, growing in bunches from the root. They are erect, ascending or procumbent, round, hairy, green or red. Leaves scattered, the lower ones peduculated, the upper ones sessile. They are narrow, oblong, hairy, obtuse at base, waved on the edge, and in the old plants sometimes revolute. The stem usually divides at top into from two to four branches, which give off crowded umbels from their upper side. The involucrum consists of numerous, short, subulate leafets. Flowers numerous, erect, of a beautifully bright orange colour. Calyx much smaller than the corolla, five parted,

the segments subulate, reflexed and concealed by the corolla. Corolla five parted, reflexed, the segments oblong. The nectary or stamineal crown is formed of five erect, cucullate leaves or cups, with an oblique mouth, having a small, incurved, acute horn proceeding from the base of the cavity of each and meeting at the centre of the flower. The mass of stamens is a tough, horny, somewhat pyramidal substance, separable into five anthers. Each of these is bordered by membranous, reflected edges contiguous to those of the next, and terminated by a membranous, reflected summit. Internally they have two cells. The pollen forms ten distinct, yellowish, transparent bodies, of a flat and spatulate form, ending in curved filaments, which unite them by pairs to a minute dark tubercle at top. Each pair is suspended in the cells of two adjoining anthers, so that if a needle be inserted between the membranous edges of two anthers and forced out at top, it carries with it a pair of the pollen masses. Pistils two, completely concealed within the mass of anthers. Germs ovate, with erect styles. The fruit, as in other species, is an erect lanceolate follicle on a sigmoid peduncle. In this it is green, with a reddish tinge and downy. Seeds ovate, flat, margined, connected to the receptacle by long silken hairs. Receptacle longitudinal, loose, chaffy.

The down or silk of the seeds, in this and other species, furnishes an admirable mechanism for their dissemination. When the seeds are liberated by the bursting of the follicle which contains them, the silken fibres immediately expand so as to form a sort of globe of branching and highly attenuated rays, with the seed suspended at its centre. In this state they are elevated by the wind to an indefinite height, and carried forward with a voyage like that of a balloon, until some obstacle intercepts their flight, or rain precipitates them to the ground.

The down of different species of Asclepias is susceptible of application to various useful and ornamental purposes. If the fibre were sufficiently long to admit of its being woven or spun, it would approach more closely to silk in its gloss and texture, than any vegetable product we possess. As it is, it has been substituted for fur, in the manufacture of hats, and for feathers in beds and cushions. When attached by its ends to any woven fabric, this down forms a beautiful imitation of the finest and softest fur skins, and is applicable to various purposes of dress. The Asclepias Syriaca, from its frequency and the large size of its pods, has been most frequently employed for the foregoing purposes. [*Note* A.]

The root of the Butterfly weed when dry is brittle and easily reduced to powder. Its taste is moderately bitter, but not otherwise unpleasant. Its most abundant soluble portions are a bitter extractive matter and fæcula. No evidence of astringency is afforded on adding solutions of isinglass or copperas, and hardly any traces of resin on adding water to alcohol digested on the root. The decoction afforded a flaky precipitate to alcohol, when the infusion did not. Boiling water may be considered the proper menstruum for this plant.

This fine vegetable is eminently intitled to the attention of physicians as an expectorant and diaphoretic. It produces effects of this kind with great gentleness, and without the heating tendency which accompanies many vegetable sudorifics. It has been long employed by practitioners in the Southern States in pulmonary complaints, particularly in catarrh, pneumonia and pleurisy, and has acquired much confidence for the relief of these maladies. It appears to be an expectorant peculiarly suited to the advanced stages of pulmonary inflammation, after depletion has been carried to the requisite extent. Dr. Parker of Virginia, as cited by Dr. Thacher, having been in the habit of employing this root for twenty five years, consid-

ers it as possessing a peculiar and almost specific quality of acting upon the organs of respiration, promoting suppressed expectoration, and relieving the breathing of pleuritic patients in the most advanced stage of the disease.

Dr. Chapman, Professor of medicine in Philadelphia, informs us that his experience with this medicine is sufficient to enable him to speak with confidence of its powers. As a diaphoretic he thinks it is distinguished by great certainty and permanency of operation, and has this estimable property, that it produces its effects without increasing much the force of the circulation, raising the temperature of the surface, or creating inquietude and restlessness. On these accounts it is well suited to excite perspiration in the forming states of most of the inflammatory diseases of winter, and is not less useful in the same cases at a more advanced period, after the reduction of action by bleeding, &c. The common notion of its having a peculiar efficacy in pleurisy, he is inclined to think is not without foundation. Certain it is, says he, that it very much relieves the oppression of the chest in recent catarrh, and is unquestionably an expectorant in the protracted pneumonies.

As far as my own observation with this plant extends, I am persuaded of its usefulness in various complaints. It appears to exert a mild tonic effect, as well as a stimulant power on the excretories. Like other vegetable bitters, if given in large quantities, especially in infusion and decoction, it operates on the alimentary canal, though its efficacy in this respect is not sufficient to entitle it to rank among active cathartics. I am satisfied of its utility as an expectorant medicine, and have seen no inconsiderable benefit arise from its use as a palliative in phthisis pulmonalis. Among other instances may be cited that of a young physician in this town, who died two years since of pulmonary consumption. He made great use of the decoction of this root, and persevered in it a long time from choice, finding that it facilitated expectoration and relieved the dyspnœa and pain in the chest, more than any other medicine.

The best mode of administering the Asclepias is in decoction or in substance. A teacup full of the strong decoction, or from twenty to thirty grains of the powder, may be given in pulmonary complaints several times in a day. In most cases after the inflammatory diathesis is in some degree subsided, it may be freely repeated as long as it agrees with the stomach and bowels.

BOTANICAL BEFERENCES.

Asclepias tuberosa, LIN. *Sp. pl.*—PURSH, i. 183.—MICHAUX, i. 117.—ELLIOTT, *Car.* i. 325.—Asclepias decumbens, *a variety*, LIN. PURSH, &c.—Apocynum Novæ Angliæ hirsutum radice tuberosa, floribus aurantiacis, HERMAN, *Hort.* 646. *t.* 647.—DILLENIUS, *Elth.* 35, *t.* 30, *f.* 34.

MEDICAL REFERENCES.

B. S. BARTON, *Collections*, 48.—THACHER, *Disp.* 154.—CHAPMAN, *Therapeutics and Mat. Med.* i. 346.

PLATE XXVI.

Fig. 1. *Asclepias tuberosa.*

Fig. 2. *A flower.*

Fig. 3. *A flower dissected, showing the mass of anthers, and one nectary with its horn.*

Fig. 4. *Magnified section of the mass of anthers, showing the situation of the pistils inside, &c. A pair of pollen masses is drawn out at the top.*

Fig. 5. *Pistils magnified, and calyx.*

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3 *Magnolia glauca* 4

MAGNOLIA GLAUCA.

Small Magnolia.

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PLATE XXVII.

Of the splendid family of trees known by the name of Magnolia, the American continent has many species. Taken collectively they furnish perhaps the most elegant assemblage produced in the forests of the temperate zone. They are distinguished by their rich, smooth foliage, large fragrant flowers, and aromatic bark. Some of them are trees of very exalted stature, taking rank with the highest tenants of the woods. The present species is more humble than the rest in its growth, yet more interesting in some of its other properties.

The Magnolia glauca has the most extensive range, especially near the sea board, of any of the species of its family. Its most northern bounda-

ry appears to be in a sheltered swamp in Manchester, Cape Ann, about thirty miles north of Boston. It here attains to but small size, and is frequently killed to the ground by severe winters. It is common in the Middle and Southern States, and Michaux informs us, that it is one of the most abundant trees in the morasses of Florida and Lower Louisiana. According to this author however, it is not usually met with far in the interior, or to the west of the mountains. Its common names are various, and change with almost every district. In Massachusetts it has no other name than *Magnolia;* in the Middle States it is called *Swamp sassafras* and *Beaver tree;* while in the Southern States it is denominated *Sweet bay* and *White bay.* It is naturally a tenant of deep boggy swamps, and is somewhat irregular in its growth. It acquires more symmetry of form when cultivated in an upland soil, although its transplantation is difficult. To insure it sussessful cultivation in a dry soil, the tree should be raised from the seed.

This tree begins to flower in different parts of the United States in May, June and July. The flowers are highly fragrant, and may be perceived by their perfume at a considerable distance. A few of them shut up in a room over night communicate to the air a heavy and almost insupportable odour.

The Magnolias are found in the class *Polyandria* and order *Polygynia*; the *Coadunatæ* of Linnæus and *Magnoliæ* of Jussieu.

This genus has a *calyx of three leaves, a corolla of six petals or more; capsules two-valved, imbricated, forming a cone; seeds berried, pendulous.*

The present species has *oval leaves, glaucous underneath*; and *obovate petals, narrowed at base.*

The bark of the young twigs is of a bright, smooth green, with rings at the insertion and scars of the leaves. The leaves are scattered, petioled, regularly elliptical, entire, and glabrous. Their under side, except the midrib, is of a beautifully pale, glaucous colour, by which the tree may be distinguished at a distance. When young, this surface is covered with a silken pubescence. Flowers solitary, terminal, on a short, incrassated peduncle. Calyx of three spatulate, obtuse, concave segments. Corolla of from eight to fourteen obovate, obtuse, concave petals, contracted at their base. The stamens are very numerous and inserted in common with the petals on the sides of a conical receptacle. Filaments very short; anthers linear, mucronated, two-celled, opening inwardly. Germs oval, collected into a cone, each one divided by a furrow and tipt with a brownish.

linear, recurved style. The fruit is a cone, consisting of imbricated cells, which open longitudinally for the escape of the seed. The seeds are obovate, scarlet, connected to the cone by a thread, which suspends them some time after they have fallen out.

The bark of the Magnolia glauca has a bitter taste, combined with a strong aromatic pungency, which approaches that of *Sassafras* and of the *Acorus calamus*. The aroma resides in a volatile portion, which is probably an essential oil, or a variety of camphor. It is lost from the bark in the dry state, after it has been kept some time. Water distilled from the green bark has its peculiar flavour with an empyreumatic smell. No oil appears on the surface, when the experiment is conducted in the small way. The dried bark affords a little resin, and more of a bitter extractive substance. Chalybeate tests produce a very slight darkening of the green colour of the decoction, but gelatin occasions no change. This might be anticipated from the little taste of astringency in the bark.

As a medicinal article, the Magnolia is to be considered an aromatic tonic, approaching in its character to Cascarilla, Canella, and articles of their class. Considered simply in regard to its tonic

powers, it is probably of a secondary order, though from the additional properties which it possesses of a warm stimulant and diaphoretic is found useful in certain disorders. Chronic rheumatism is one of the diseases in which it exhibits most efficacy. Not only the bark, but the seeds and cones which are strongly imbued with the sensible qualities of the tree, are employed in tincture with very good success in this disease.

In intermittent and remittent fevers the Magnolia is one of the many tonics which have been resorted to for cure by the inhabitants of the marshy countries where they prevail. Sufficient testimony has been given in favour of the bark of this tree, to warrant a belief that it is fully adequate to the removal of fever and ague, when administered like the Cinchona, in liberal quantities between the paroxysms. In the more continuous forms of fever of the typhoid type, it has also received the commendations of physicians.

Several other species of Magnolia resemble the present very closely in their sensible properties, and as far as experiments have been tried, they are similar in their medicinal effects. In order to secure the whole efficacy residing in these trees, a tincture should be made from the bark or cones while green or very recently dried, before their more volatile parts have escaped.

BOTANICAL REFERENCES.

Magnolia glauca, LIN. *Sp. pl.*—MICHAUX, i. 323.—PURSH, ii. 381.—MICHAUX, FIL. *Arb. forest*, iii. 77.—Magnolia lauri folio subtus albicante. CATESBY, *Car.* i. *t.* 39.—TREW, *sel. t.* 9.—DILLENIUS, *Hort.* 207. *t.* 168, *f.* 205.—Laurus tulipifera &c.—RAIUS, *hist.* 1690.

MEDICAL REFERENCES.

KALM, *Travels*, i. 205.—MARSHALL, *Arbustum*, 83.—HUMPHRIES, *Med. Commentaries*, vol. xviii.—BART. *Coll.* 46.—PRICE, *Inaugural Diss. Philad.* 1812.

PLATE XXVII.

Fig. 1. *A flowering branch of Magnolia glauca.*

Fig. 2. *The fruit and seeds.*

Fig. 3. *Stamen magnified.*

Fig. 4. *A germ and style ditto.*

Cornus florida

CORNUS FLORIDA.

Dogwood.

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PLATE XXVIII.

THE family of Cornels, if surveyed by other eyes than those of botanists, is remarkable for the difference of growth and appearance of its various species. Many of them are shrubs; a few attain to the stature of trees, while some are so humble in their growth as to be deemed hardly more than herbaceous. A part have their flowers surrounded with a fine white involucrum, many times exceeding the whole bunch in magnitude; while others present their naked cymes unadorned by any investment. To the botanical observer they all exhibit a close affinity and resemblance to each other; which is seen in the form and anatomical texture of their leaves, the structure of their flowers and the appearance of their fruit.

The *Cornus florida*, or flowering Dogwood, is the largest and most splendid of its genus, and is one of the chief ornaments of our forests. As a tree it is rather below the middle stature, not usually reaching the height of more than twenty or thirty feet. It is however among the most conspicuous objects in the forests, in the months of April, May and June, according to its latitude, being then covered with a profusion of its large and elegant flowers. In Massachusetts, especially about Boston, it is not a common tree, only scattered individuals appearing here and there in the woods. In the Middle States it is extremely common, especially in moist woods. Michaux informs us, that in the Carolinas, Georgia and the Floridas it is found only on the borders of swamps, and never in the pine barrens, where the soil is too dry and sandy to sustain its vegetation. It is also not very common in the most fertile parts of the Western States, being chiefly found where the soil is of secondary quality.*

* Mr. William Bartram, in his travels in Georgia and Florida, gives the following account of the appearance of this tree near the banks of the Alabama river. "We now entered a very remarkable grove of Dogwood trees, *(Cornus florida,)* which continued nine or ten miles unalterable, except here and there a towering *Magnolia grandiflora*. The land on which they stand is an exact level; the surface a shallow, loose, black mould, on a stratum of stiff, yellowish clay. These trees

The genus *Cornus* is characterized by the following marks. *Petals four, superior; involucrum of four leaves, or wanting; drupe with a two-celled nut.* The species *florida* is *arboreous, with its flowers in heads surrounded by an involucrum of obovate leaves with recurved points.*

Class *Tetandria*, order *Monogynia*, natural order *Stellatæ*, Lin. *Caprifolia*. Juss.

The Cornus florida is of slow growth, and possesses a very compact wood, covered with a rough, broken bark. The branches are smooth, covered with a reddish bark, marked with rings at the place of the former leaves. The leaves, which are small at the flowering time, are opposite, petioled, oval, acute, entire, nearly smooth, paler be-

were about twelve feet high, spreading horizontally, their limbs, meeting and interlocking with each other, formed one vast, shady, cool grove, so dense and humid as to exclude the sun-beams, and prevent the intrusion of almost every other vegetable, affording us a most desirable shelter from the fervid sun-beams at noon day. This admirable grove has by way of eminence acquired the name of Dog woods.

During a progress of near seventy miles through this high forest, there constantly presented to view, on one hand or the other, spacious groves of this fine flowering tree, which must in the spring season, when covered with blossoms, present a most pleasing spectacle, when at the same time a variety of other sweet shrubs display their beauty; as the Halesia, Stewartia, Æsculus, Azalea, &c. entangled with garlands of Bignonia, Glycine, Lonicera, &c. &c. at the same time the superb Magnolia grandiflora standing in front of the dark groves, towering far above the common level." *Travels*, p. 399.

neath, and marked, as in others of the genus, with strong parallel veins. The flowers, which are very small, grow in heads or sessile umbels, upon peduncles an inch or more in length. At the base of each bunch is the large spreading involucrum, constituting the chief beauty of the tree when in flower. This involucrum is composed of four white, nerved, obovate leaves, having their point turned abruptly down or up, so as to give them an obcordate appearance. This point has frequently a reddish tinge. Calyx superior, somewhat bell-shaped, ending in four obtuse spreading teeth. Petals four, oblong, obtuse, reflexed. Stamens four, erect, the anthers oblong with the filaments inserted in their middle. Style erect, shorter than the stamens, with an obtuse stigma. The fruit is an oval drupe of a glossy scarlet colour, containing a nucleus with two cells and two seeds.

The bark of the Cornus florida is a powerful bitter, possessing also an astringent and somewhat aromatic taste. Both tannin and the gallic acid are abundantly developed in its solutions by their proper tests. In my experiments with the bark of young twigs, but a small quantity of pure resin was made manifest. It would seem that the principal seat of the bitterness is in a variety of extractive matter.

In a valuable inaugural dissertation on the Cornus florida and Cornus sericea by Dr. Walker of Virginia, much attention appears to have been bestowed on the chemical properties of their bark. He found that water distilled from the bark in powder had a transparent, whitish appearance, with a slight aromatic odour, and no perceptible taste. When the heat was increased, the fluid had a lemon colour, with an unpleasant smell and an acerb taste. These effects were probably produced by the volatilization and partial decomposition of portions of the bark in consequence of the heat being continued until the mixture was evaporated nearly to dryness.

With a view to ascertain the effect of different menstrua, Dr. Walker subjected to experiment the residual mass furnished by evaporating a decoction of the root of Cornus florida. Two drachms of this residuum, which had been furnished by seven and an half ounces of the decoction, were macerated in successive quantities of the best alcohol, until the last portion ceased to be changed in colour and taste. The part, which remained undissolved, weighed only half a drachm. When redissolved it was destitute of taste, and underwent no change of colour on adding the test of iron. The alcohol, which had been employed in the ex-

periment, was found to possess an intensely bitter taste with astringency, of a clear red colour, and turning to a deep black on the addition of iron. On evaporation, it yielded a drachm and an half of residuum.—Dr. Walker attempted to ascertain the quantity of resin by macerating the alcoholic extract in repeated portions of sulphuric ether. The ether acquired a dark colour and a bitter taste, and was found to have dissolved three quarters of the extract. When tested with iron, it was found that the remaining quarter only was changed to a black colour.

The Cornus florida is one of the many vegetables which, by the union of their gallic acid with the salts of iron, form a black compound, applicable to the purposes of ink. The constancy of the black colour thus produced varies greatly, according to the substance from which the gallic acid is derived. It is often extremely fugacious, sometimes fading in a few days, and at others becoming indistinct after some weeks or months. Considering the very great importance of the purposes for which ink is employed, and the immense evils which may result from its obliteration in writings intended for permanency; it is with extreme caution that we should recommend the introduction of any change in the mode of its formation. The

oak gall has had the experience of ages in favour of its permanence and immutability. It is not until some indigenous article, producing an equal intensity of colour, has undergone a series of trials from time and exposure, sufficient to establish beyond a doubt its durability, that its substitution in the manufacture of ink should be considered expedient or even justifiable.

Upon the human body the bark of the Cornus florida acts as a tonic, an astringent and an antiseptic, approaching in its general effects to the character of the Peruvian bark. From a variety of experiments made by Dr. Walker upon the healthy system, it was found that this medicine uniformly increased the force and frequency of the pulse, and augmented the heat of the body. Collateral experiments were made at the same time with the Peruvian bark, with which the Cornus appeared to agree both in its internal and external effects.

In disease it has been principally employed in the same cases for which the cinchona is resorted to, particularly intermittent and remittent fever. Dr. Gregg of Pennsylvania, cited by Dr. Walker, states, that after employing the Cornus florida habitually for twenty three years in the treatment of intermittents, he was satisfied that it was not in-

ferior to the Peruvian bark as a means of cure in such cases. Among the number of cures by this medicine, was that of his own case. He observed that in its recent state it sometimes disagreed with the stomach and bowels, but that this tendency in the article was corrected by age. He recommends the bark as being in the best state after it has been dried a year.

Other medical men have employed the bark of this tree with advantage in intermittents, and also in continued fevers of the typhoid type. Its tonic operation in these cases appears very analogous to that of the Peruvian bark.

I have employed the tincture of Cornus florida as a stomachic in various instances of loss of appetite and indigestion. The report of those who have taken it has perhaps been as frequently in favour of its effects, as of gentian, columbo, and the other imported tonics of the shops, though perhaps it is somewhat more liable to offend the stomach in large doses. In the Southern States a decoction of the buds and twigs has been thought to agree better with weak stomachs, than the other preparations.

Some other species of this family resemble the present tree in the bitterness and tonic power of their bark, particularly the Cornus *circinata* and C. *sericea*.

The wood of the Cornus florida is hard, heavy and fine grained, and susceptible of a good polish. It is employed for various purposes where strength and solidity are required, although its small size does not permit it to be used for objects of much magnitude. From its hardness it is found peculiarly useful for handles of instruments, the teeth of wheels, and the smaller parts of wooden machinery.

BOTANICAL REFERENCES.

Cornus florida, LIN. *Sp. pl.*—GRONOVIUS, *Virg.* 17.—KALM, travels, ii. 321.—WANGENHEIM, *Amer. p.* 51, *t.* 17.—L'HERITIER, *Corn. n.* 3.—SCHMIDT, *Arb. t.* 62—*Botanical Mag. t.* 526.—PURSH, i. 108.—MICHAUX, FIL. *Arbres forestiers*, iii. 138, *translated*, i. 255.—ELLIOTT, *Car.* i. 207.—Cornus mas Virginiana, &c.—PLUKENET, *Alm.* 120, *t.* 2, *f.* 3.—CATESBY, *Car. t.* 27.

MEDICAL REFERENCES.

WALKER, *Inaugural Dissertation, Philad.* 1803.—BART. *Coll.* 12.—THACHER, *Disp.* 203.—ELLIOTT, *ut supra.*

PLATE XXVIII.

Fig. 1. *Cornus florida, a branch with flowers, and one with leaves.*

Fig. 2. *Fruit.*

Fig. 3. *A flower.*

PANAX QUINQUEFOLIUM.

Ginseng.

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PLATE XXIX.

In the early part of the eighteenth century some accounts were sent to Europe by travellers and missionaries, of a root growing in Chinese Tartary, known by the name of *Ginseng*, upon which a high value was set by the eastern Asiatics, and which was sold in the cities of China at an enormous price. Father Jartoux, a missionary at Pekin, who had an opportunity of witnessing the collection and use of this root, made a drawing of the plant, accompanied with a particular description, and an account of its uses, and the cause of its high estimation and demand among the Chinese. While on a journey among the mountains of Tartary, performed under the sanction of the emperor of China, he met in various instances

Linnæ quinquefolium

with the plant, and with people employed in collecting it. He states that the root is found principally between the 39th and 47th degree of north latitude, in thick forests, upon the declivities of mountains, on the banks of torrents, and about the roots of trees. It never grows in the open plains or vallies, but always in dark, shady situations, remote from the sun's rays.

As the right of gathering this root is monopolized by the emperor of China, the most extensive precautions are taken by him to prevent an encroachment on this privilege. The places where the Ginseng is known to grow are guarded with great vigilance, and a whole province, that of Quantong, bordering on the desert, is surrounded by a barrier of wooden stakes, about which guards continually patrole, to keep the inhabitants within bounds, and prevent them from making excursions into the woods, in search of the prohibited drug. Notwithstanding this vigilance, their eagerness after gain incites the Chinese to wander by stealth in the desert, sometimes to the number of two or three thousand, in search of the root, at the hazard of losing their liberty, and all the fruits of their labour, if they are taken. The emperor employs his own servants for the purpose of collection, and in the year 1709, had ten

thousand Tartars engaged in scouring the woods in pursuit of the plant. Each man so employed was obligated to present his majesty two ounces of the best he should collect, and to sell him the rest for its weight in pure silver. At this rate it was computed that the emperor would get in a year, about 20,000 Chinese pounds, which would cost him not above one quarter of its value, at the common rate of selling it.

The collectors of the Ginseng carry with them neither tents nor beds, every one being sufficiently loaded with his provision, which is only parched millet, on which he is obliged to subsist during the whole journey. The mandarins send them from time to time some pieces of beef, with such game as they happen to take, which they eat very greedily, and almost raw. They are accustomed to sleep on the ground, and notwithstanding six months are passed in this way, they continue lusty and in perfect health.

The army of herbalists, in order to scour the country effectually, divide themselves into companies of one hundred each, which proceed forward in direct line, every ten of them keeping at a distance from the rest. In this way they overrun an extensive wilderness in a short space of time.

If any one of the company was wanting, as it often happened, either by having wandered out of the way, or being attacked by wild beasts, the party devoted a day or two to search for him, and then returned to their labour.

The root of the Ginseng is the only part preserved. The collectors bury in the ground every ten or fifteen days all that they have procured. In order to prepare it for use, they dip it in scalding water, and scour it with a brush. The roots are then prepared with the fumes of a species of millet, to give them a yellow colour. The millet is put in a vessel with a little water and boiled over a gentle fire. The roots are placed over the vessel upon transverse pieces of wood, being first covered with a linen cloth or another vessel. When treated in this way they assume upon drying a horny or semi-transparant appearance.

The roots may also be dried in the sun, or by the fire, and retain their qualities perfectly. In this case, however, they have not that yellow colour, which the Chinese so much admire.

The Chinese consider the Ginseng as possessing unequalled medicinal powers, and their physicians have written many volumes upon the qualities of the plant. It is made an ingredient in almost all the remedies which they give to their nobility, its

price being too expensive for the common people. The sick take it to recover health, and the healthy to make themselves stronger and more vigorous. They affirm that it removes all fatigue, either of body or mind, dissolves humours, cures pulmonary diseases, strengthens the stomach, increases the vital spirits, and prolongs life to old age. Its price at Pekin, according to travellers, has been eight or nine times its weight in silver, and even more.

Father Jartoux became so far a convert to the virtues of the plant, that he tells us that after having taken half of a root, he found his pulse quicker and fuller, his appetite improved, and his strength increased so as to bear labour better than before. On another occasion, finding himself so fatigued and wearied as to be scarce able to sit on horseback, a mandarin in company perceiving his distress, gave one of the roots. He took half of it, and in an hour was not sensible of any weariness. "I have observed," says he, "that the green leaves, especially the fibrous part of them, when chewed, would produce nearly the same effect. The Tartars often bring us the leaves of Ginseng instead of tea, and I always find myself so well afterwards, that I should readily prefer them before the best tea. Their de-

coction is of a grateful colour, and when one has taken it twice or thrice, its taste and smell become very pleasant."

The Chinese use a decoction of the root, for which they employ about a fifth part of an ounce at a time. This they boil in a covered vessel with two successive portions of water, in order to extract all its virtue.

The following is the substance of Jartoux's description of the Asiatic plant. The root is whitish, rugged and uneven. The stalk is round, and shaded with red; it terminates in a knot or joint at top, from which proceed four equal branches. Each branch produces five leaves, which are equidistant from each other, and from the ground. The leaves are unusually thin and fine, with their fibres very distinguishable, and a few whitish hairs on the upper side. Their colour is dark green above, and a pale, shining green underneath. All the leaves are serrated or finely indented on the edge.—From the centre of the branches rises a second stalk which is very straight and smooth, and whitish from bottom to top, bearing a bunch of round fruit, of a beautiful red colour, composed of twenty four red berries. The red skin of the berry is thin and smooth, and contains a white pulp. As these berries were double, (for they

are sometimes found single,) each of them had two rough stones, separated from each other, of nearly the size and figure of common lentils. The berries were supported on small sprigs, which rose from a common centre like the rays of a sphere. The fruit is not good to eat. The berries are not round but a little flat on each side. When they are double there is a depression or hollow place in the middle where the two parts unite. Each berry has a small beard at top diametrically opposite to the sprig on which it hangs. When the berry is dry there remains only a shrivelled skin, adhering close to the stones, of a dark red, or black colour.

The plant dies away and springs up again every year. The number of years may be known by the number of stalks it has shot forth, of which there always remains a mark or scar on the upper part of the root.

"As to the flower," says he, "not having seen it, I can give no description of it. Some say it is white and very small; others have assured me that the plant has none, and that nobody ever saw it. I rather believe that it is so small and so little remarkable, that none of them ever took notice of it.

"There are some plants, which, besides the bunch of berries, have one or two berries like the former, placed an inch or an inch and an half below the bunch. And when this happens, they say if any one takes notice of the point of compass to which these berries direct, he will not fail to find more of the plant."

The foregoing description of Jartoux is introduced as being a very intelligible description of a plant, in language not the most botanical. The drawing, which accompanies the description, is very satisfactory.

The report of the high value of the Ginseng at Pekin led to an inquiry among Europeans, whether the plant was not to be found in parallel latitudes, in the forests of North America. Father Lafiteau, a Jesuit, missionary among the Iroquois, after much search, found a plant in Canada answering the description, and sent it to France. In 1718, M. Sarrasin published in the Memoirs of the Academy an account of the American Ginseng; which, together with one published by Lafiteau the same year, seemed to put its identity with the Chinese vegetable beyond a doubt.

Soon after this the French commenced the collection of the root in Canada for exportation. For this purpose they employed the Indians, who

brought it to the merchants for a certain compensation. At one period the Indians about Quebec and Montreal were so wholly taken up in the search for Ginseng, that their services could not be engaged for any other purpose. The American English engaged in the same traffic, and although the plant is a rare one in the woods, yet very large quantities of the root were collected. In 1748, Kalm tells us the common price of the root at Quebec was from five to six livres a pound. The first shipments to China proved extremely profitable to those concerned, especially to the French. In a short time, however, the amount exported overstocked the market, the Chinese began to think the American Ginseng inferior to the Tartarian, and its value depreciated, so that it ceased to be an object of profitable commerce. Its demand has not materially risen at any subsequent period, although it is still occasionally exported. The Chinese most readily purchase the forked or branching roots; and those exporters have been most successful, who have prepared their Ginseng by clarifying it after the Chinese manner.

The American Ginseng is thinly scattered throughout the mountainous regions of the Northern and Middle States. Kalm informs us, that it

is seldom found north of Montreal. Michaux states that it inhabits mountains and rich, shady woods from Canada to Tennessee. I have principally met with this plant in the western parts of Massachusetts, and in Vermont, especially on the sides of the Ascutney mountain. Bartram found it near the mouth of the Delaware.

Linnæus has given to the genus of plants, which includes the Ginseng, the name of *Panax*, a Greek word, intended to express the reputed character of the Chinese *panacea*.

The character of this genus consists in *a simple umbel; corolla five petalled; berry inferior, two or three seeded; plants polygamous.*

The species *quinquefolium* has *three quinate leaves.*

The root of this plant consists of one or more fleshy, oblong and somewhat fusiform portions, of a whitish colour, transversely wrinkled, and terminating in various radicles. Its upper portion is slender and marked with the scars of the former shoots. Stem smooth, round, green, with often a tinge of red, regularly divided at top into three petioles, with a flower-stalk at their centre. Petioles round, smooth, swelling at base. Leaves three, compound, containing five, rarely three or seven leafets. The partial leaf-stalks are given

off in a digitate manner, and are smooth, compressed and furrowed above. Leafets oblong, obovate, sharply serrate, acuminate, smooth on both sides, with scattered bristles on the veins above. The flowers, which are small, grow in a simple umbel on a round, slender peduncle, longer than the petioles. The involucrum consists of a multitude of short subulate leafets, interspersed with the flower-stalks. These stalks or rays are so short as to give the appearance of a head, rather than umbel. In the perfect flowers the calyx has five small acute teeth; the corolla five petals, which are oval, reflexed and deciduous. Stamens five, with oblong anthers. Styles two, reflexed, persistent; germ large, inferior, ovate-heart shaped, compressed. The berries are kidney shaped, retuse at both ends, compressed, of a bright scarlet colour, crowned with the calyx and styles, and containing two semi-circular seeds. In most umbels there are flowers with only one style, in which case the berry has a semi-cordate form, as represented in fig. 3. Sometimes there are three styles and three seeds. The outermost flowers ripen first, and their berries often obtain their full size before the central ones are expanded. The middle flowers are frequently abortive.

There are also barren flowers, on separate plants, which botanists describe as having larger petals, and an entire calyx. I have not met with plants of this description in flower.

The foregoing character leaves little doubt that the American plant is precisely the same with the Asiatic, although Loureiro and some others have disputed their identity. The description of Jartoux, which has been given, as well as his drawing of the plant, agrees in every respect, except that his plant had four branches or leaves, instead of three. This is accounted for by supposing he had chosen a luxuriant specimen.—It is somewhat remarkable that the names of the Chinese, and of the North American Indians, should signify the same thing in their respective languages, viz. a resemblance to the *figure of a man.* This resemblance, however, it must be confessed, even in the branching roots, is rather of a humble kind.

The genus Panax was placed by Linnæus in his class *Polygamia*, and by late writers in *Pentandria, Digynia.* The plants of this family were also referred by Linnæus to his natural order *Hederaceæ*, or somewhat heterogeneous assemblage of vegetables; and by Jussieu to his *Araliæ.* Later botanists have placed them among the *Um-*

belliferous vegetables, from which they differ in their berried fruit. The genus most near to Panax is unquestionably *Aralia*, which differs only in the number of styles, a character extremely variable in the Ginsengs.*

The root of the Ginseng has an agreeable taste, consisting of a mixture of sweet and bitter, with some aromatic pungency. Water, both cold and hot, receives a gummy mucus, which is precipitated by alcohol. The watery extract has the taste and smell of the root in a strong degree. The distilled water gives evidence of a volatile oil, and has the aroma, without the sweetness of the root. The common tests indicate the presence of but little resin, and no tannin.

As far as Ginseng has been tried medicinally in this country, and in Europe, its virtues do not appear, by any means, to justify the high estimation of it by the Chinese. That it is not a very active substance, is proved by the fact, that a whole root may be eaten without inconvenience. Its place in the materia medica is among demulcents. It approaches more nearly to liquorice, than to any other medicine in its taste and exter-

* *Panax trifolium*, a beautiful little plant, with nearly the herb of Anemone nemorosa, has always three styles and a tricoccous berry. P. quinquefolium varies from one to three styles, though the usual number is two.

nal qualities. Its extract forms a very neat preparation, and is by no means unpleasant to the taste. Dr. Fothergill tells us, that "in tedious chronic coughs, incident to people in years, a decoction of it has been of service. It consists of a lubricating mucilage combined with some degree of aromatic warmth."

Ginseng is principally sold by our druggists as a masticatory, many people having acquired an habitual fondness for chewing it. It is certainly one of the most innocent articles for this purpose.

BOTANICAL REFERENCES.

Panax quinquefolium, Lin. *sp. pl.*—Michaux, *Flora*, ii. 256.—Pursh, i. 191.—Woodville, *Med. Bot.* i. *t.* 58.—*Botanical Mag. t.* 1023.—Aureliana Canadensis, Catesby, *Car. Suppl. t.* 16.—Breynius *in Prod. rar. p.* 52.—Araliastrum foliis ternis quinquepartitis, Ginseng sen Ninsin officinarum.—Trew, *Ehr. t.* 6, *f.* 1.

MEDICAL REFERENCES.

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PLATE XXIX.

Fig. 1. *Panax quinquefolium.*

Fig. 2. *A flower magnified.*

Fig. 3. *Umbel in flower, the external fruit nearly grown.*

Fig. 4. *Germ, calyx and styles magnified.*

Fig. 5. *Root.*

Polygala Senega

POLYGALA SENEGA.

Seneca Snake root.

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PLATE XXX.

THE Seneca snake root has attracted so general an attention from the medical public, as to have become an article of exportation to Europe, and one which holds a regular place in the druggist stores. The plant which produces it has nothing to boast on the score of elegance, and little to attract attention independent of its medicinal virtues. It grows in most latitudes of the United States, especially in the mountainous tracts. The specimen, from which our drawing was taken, was gathered on the borders of Lake Champlain.

The genus *Polygala* has *a five leaved calyx, two of the leaves wing like, and coloured. Capsule obcordate, two celled, and two valved.*

The species *Senega* has *erect, smooth, simple stems, with alternate, lanceolate leaves, broadest at base. Flowers slightly crested.*

Class *Diadelphia*, order *Octandria;* natural orders *Lomentaceæ*, Linn. *Pediculares*, Juss.

The Polygala senega has a firm, hard, branching perennial root, consisting of a moderately solid wood, and a thick bark. This root sends up a number of annual stems, which are simple, smooth, occasionally tinged with red. The leaves are scattered, nearly or quite sessile, lanceolate, with a subacute point, smooth, paler underneath. Flowers white, in a close terminal spike. The calyx, which in this genus is the most conspicuous part of the flower, consists of five leafets, the two largest of which, or wings, are roundish-ovate, white, and slightly veined. Corolla small, closed, having two obtuse lateral segments, and a short crested extremity. Capsules obcordate, invested by the persistent calyx, compressed, two celled, two valved. Seeds two oblong-obovate, acute at one end, slightly hairy, curved, blackish, with a longitudinal, bifid, white appendage on the concave side. The spike opens gradually, so that the lower flowers are in fruit while the upper ones are in blossom.

The rose coloured variety of this plant, as it has been considered by Michaux, proves to be a distinct species. Some species which I possess from Carolina have branching, pubescent stems, and very long, loose spikes. The flowers are several times larger than those of P. senega.

The root of the Polygala senega has an unpleasant and somewhat acid taste. After chewing, it leaves a sensation of acrimony in the mouth, and still more in the fauces, if it has been swallowed. These properties it communicates fully to water upon boiling. The process of decoction does not appear to dissipate any of its power, since the distilled water is destitute of the taste and smell of the plant. Alcohol dissolves a substance, apparently of the resinous kind, giving a precipitate when water is added. Iron produces little change in solutions of this root, and gelatin occasions no alteration whatever.

Medicinally administered, the Seneca snake root is sudorific and expectorant in small doses, and emetic and cathartic in large ones. Its most usual mode of exhibition is in decoction, which may be made of suitable strength by boiling an ounce of the root in a pint and an half of water, till it is reduced to a pint. This preparation may

in most cases be given in doses of a table spoonful and upward without disturbing the stomach.

The first reputation of the Seneca root was one which it divides with a multitude of other plants, that of curing the bite of the Rattlesnake. A reward was given by the legislature of Pennsylvania to Dr. Tennent for the promulgation of this supposed property. When, however, we consider the number of cases of recovery from the bite of this serpent, under every variety of treatment, we cannot avoid the conclusion, that these injuries are not necessarily dangerous, and that spontaneous recoveries are perhaps as frequent as those which are promoted by medicine.

More certain success attends the use of the Seneca in pneumonia and some diseases related to it. In the advanced stages of pneumonic inflammation, after venesection and the other usual remedies have been carried to their proper extent; and the cough still remains dry and painful, while the debility of the patient forbids further depletion; in these cases, I have often found a decoction of the Seneca root to afford very marked relief by promoting expectoration, and relieving the tightness and oppression of the chest. Various medical writers have spoken favourably of its employ-

ment in these cases, among whom are Lemery and others, in the Memoirs of the French Academy. It has been found injurious, from its stimulating properties, when given at too early a stage, or during the prevalence of much acute inflammation.

Benefit has been derived in *asthma* from the use of this plant. The following is Dr. Bree's opinion, quoted from his treatise on that disease. "Decoction of seneka is eminently useful in the first species, administered to old people, but in the paroxysm of young persons, I have found it too irritating. This distinction applies to convulsive asthma purely uncomplicated, but the disease is frequently observed in middle aged and elderly persons, to take the character of peripneumonia notha in the winter and spring, and seneka is then the most useful medicine that I have tried. In such cases, it should be united with acetated ammonia, during the febrile state, and as this state gives way, the addition of squill, and camphorated tincture of opium, will be found to promote expectoration, perspiration, and urine in a most powerful manner."

In croup, this medicine was introduced into notice by Dr. Archer of Maryland. He speaks with much confidence of its utility in that disease,

particularly in promoting the separation and discharge of the membrane formed in the trachea of patients affected by it. Such a membrane, however, does not exist in all cases of croup. And in the early part of the complaint it may be questioned, how far a medicine, which acts as a stimulant to the fauces and neighbouring organs, is entitled to reliance, in a local inflammation of the trachea. It ought not from such a reliance to exclude more active remedies, especially venesection. Dr. Archer's mode of administering it is to give a tea-spoonful of a strong decoction every hour or half hour, according to the urgency of the symptoms, and during the intervals, a few drops occasionally, to keep up a sensible action of the medicine upon the mouth and throat, until it acts as an emetic or cathartic.

In various forms of dropsy, the Seneca root has been resorted to with advantage, and has received the commendations of Percival, Millman, and some others. Its cathartic and diuretic effects are very considerable, when regularly persevered in, in quantities as large as will set easily on the stomach; and have in various instances effected the dissipation of dropsical swellings.

In chronic rheumatism, this root sometimes does good by its universally stimulant and diapho-

retic effects. The following case occurred to me some time since in practice. A man labouring under severe rheumatism was ordered to take at intervals a wine glass full of a strong decoction of the Senega made from an ounce of the root in a pint of water. The patient, from a desire to expedite the cure, thought proper to drink the whole quantity at once. The consequence was the most violent vomiting and purging, which lasted the whole night, accompanied with profuse diaphoresis. The patient, as might have been hoped from the violence of the operation, was radically relieved of his disorder.

In uterine complaints, particularly amenorrhea, the Polygala senega has been found of decided efficacy. Dr. Chapman of Philadelphia is one of the authorities for its use in these cases. It must be given largely, and continued for some time.

The most common mode of exhibition of this root is in decoction, as already mentioned. It is also given in powder in doses of twenty or thirty grains. Dr. Tennent likewise employed a wine of Senega made by digesting four ounces of the root in a pound of wine, of which three spoonfuls were given at a dose.

BOTANICAL REFERENCES.

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PLATE XXX.

Fig. 1. *Polygala senega.*
Fig. 2. *A flower magnified.*
Fig. 3. *Calyx of the same.*
Fig. 4. *Corolla magnified.*
Fig. 5. *Capsule.*
Fig. 6. *A seed.*

PL. XXII

Liriodendron tulipifera

AMERICAN

MEDICAL BOTANY.

LIRIODENDRON TULIPIFERA.

Tulip Tree.

PLATE XXXI.

THE vegetable world can hardly offer a more interesting object, than a tree of exalted stature and extensive shade, covered with a beautiful and singular foliage, putting forth from its boughs an immense number of large and variegated flowers, at the same time that its trunk affords one of the most useful species of wood, and its bark an aromatic medicinal agent. Such an one is the Tulip tree of the United States.

The forests of the Middle and Western States, according to the representation of Michaux, abound with the Liriodendron tulipifera, as do likewise the elevated parts of Carolina and Georgia. It is found in the New England states, but is principally confined to the southern parts of them.

Cultivated trees are common in Boston and its vicinity, but I have never met with it in the woods of this part of the country, nor to the north of it upon the sea board.

In point of size the Liriodendron is exceeded by few trees of the North American forest. Its growth is regular, straight and majestic. Its trunk often acquires a diameter of from two to three feet, and an elevation of eighty or ninety. In favourable situations it frequently exceeds these dimensions. Michaux measured a tree near Louisville in Kentucky, which at five feet from the ground was twenty two feet and an half in circumference, and which he estimated to be a hundred and twenty or a hundred and forty feet in height. Catesby informs us that the circumference is sometimes thirty feet,

The names of *Tulip tree*, *White wood*, *Canoe wood*, and *Poplar* are applied to this tree in different parts of the United States. Its flowering time is in the months of May and June.

The genus Liriodendron, to which Linnæus has assigned four species of trees, is characterized by *a double calyx, the outer of two, the inner of three leaves; petals six, seeds imbricated into a cone.*

Thc species tulipifera, the only one in America, is remarkably distinguished by its *lobed and truncated leaves.*

Together with several other of our finest flowering trees and shrubs, the Liriodendron is found in the class *Polyandria* and order *Polygynia*, and the natural orders *Coadunatæ* of Linnæus and *Magnoliæ* of Jussieu.

The branches of the Tulip tree are of a greyish colour inclining to red. The buds which terminate them in winter are very curiously constructed. They are obovate, and flattened or compressed into a sharp edge at the extremity. They are made up of a number of concentric sheaths, each of which contains a single miniature leaf between it and the next interior sheath. This leaf, instead of embracing the next sheath, is folded up and bent down upon one side of it. When vegetation begins in the spring the sheaths swell to a large size before bursting, and at length liberate the leaves one at a time, the remains of each sheath becoming converted into a stipule.

The leaves of the Tulip tree have a form altogether peculiar, and which is not resembled by any other production of our forests. They are divided into four pointed lobes and terminated by a shallow notch, the extremity being nearly

square, and the middle rib ending abruptly, as if cut off. In the large leaves, the two lower lobes are furnished with a tooth or additional lobe on their outside. They are attached by long pedun-cles and have a beautifully smooth and bright green surface. There is one variety of this tree which has the lobes of its leaves not pointed, but very obtuse. The flowers are large, solitary, and terminal. The outer calyx has two triangular leaves which fall off as the flower expands. The inner calyx consists of three large, oval, concave, veined leaves, of a pale green colour, spreading at first, but afterwards reflexed. Petals six, some-times more, obtuse, concave, veined, of a pale yel-lowish green, marked with an irregular, indented crescent of bright orange on both sides toward the base. Stamens numerous, with long linear anthers opening outwardly, and short filaments. Pistil a large, conical, acute body, its upper half covered with minute, blackish, recurved stigmas; its lower furrowed, being a mass of coalescing styles and germs. The fruit is a cone of imbri-cated seed vessels, which are woody and solid, their upper portion formed by a long lanceolate scale. Seeds two, blackish, ovate, one or both often abortive.

The bark of the Tulip tree has a very bitter taste and a strong aromatic pungency. The latter property appears to reside in a volatile oil. When the bark is distilled with water, it fills the apartment with its fragrant odour, yet the product of the distillation, at least when the process is conducted in the small way with the luting of the apparatus not perfectly tight, has scarcely any taste or smell. Dr. Rogers informs us that he obtained an oily matter in the form of a whitish scum on the surface of the water in the receiver. A bitter resin exists in small quantities in the bark. Water dissolves a mucous substance, which is precipitated in a flocculent form by alcohol. Water is also impregnated with the bitterness, and, if too much heat be not employed, with some of the aroma of the tree. The sulphate of iron produced a dark brown colour, but a solution of isinglass did not increase the chemical evidence of astringency, producing a barely perceptible effect. Alcohol and proof spirit may be considered the most perfect solvents of the active ingredients of this article, although water dissolves enough to produce its medicinal effect.

The bark both of the root and branches acts on the system as a stimulating tonic and diaphoretic, having properties resembling the Cascarilla

and other aromatic barks of the shops. The disease in which it has been most employed is intermittent fever. But the triumph which results from the occasional cure of this disease is now divided among so large a list of tonic medicines, that the distinction conferred by it is not of the most signal kind. As a warm sudorific, this bark seems well adapted to the treatment of chronic rheumatism, and for this purpose it has been employed with success by various medical practitioners in the United States. In some diseases of an inflammatory type in which it has been recommended, its stimulating properties render it more like to do harm than good. The only personal acquaintance which I have had with it, is as a stomachic. Administered with this view, it has been acceptable and apparently useful to patients who had derived occasional benefit from "Huxham's tincture," "Stoughton's elixir," and similar compositions of bitter and aromatic drugs.

The wood of the Tulip tree is smooth and fine grained, very easily wrought and not liable to split. It is used for various kinds of carving and ornamental work, and for articles of house furniture. In the Western States where pine lumber is scarce, Michaux tells us, that the joinery or inside work of houses is most frequently of this

material. A common use of it throughout the United States is in the manufacture of carriages to form the pannels of coach and chaise bodies. For this purpose it is particularly fitted by its smoothness, flexibility and toughness.*

The true or heart wood of this tree is of a yellowish colour and differs in proportion in different trunks. We are told that two varieties of the tree exist, denominated the yellow and the white, and which appear to be in some measure produced by the mode and place of growth. The yellow variety is most valuable, having least alburnum and being less subject than the other to decay.

The Tulip tree has been long since introduced from this country into the forests and fields of Europe. Its use, ornamental appearance, and the facility with which it is raised, have rendered it one of the most prominent and interesting objects of forest cultivation.

* The various economical uses of this tree are treated of at large in the splendid work of the younger Michaux on the *Forest trees of North America.* Those who appreciate the value of a correct knowledge of the various internal resources of our country, will be gratified that a translation of this important work, with the original plates, is now publishing at Paris and Philadelphia.

BOTANICAL REFERENCES.

Liriodendron tulipifera, LINNÆUS, *Sp. pl.*—CURTIS, *Bot. Mag. t.* 275.—MICHAUX, i. 526.—MICHAUX, FIL. *Arbres forestiers*, iii. 202.—PURSH, ii. 382.—Liriodendron foliis angulatis truncatis, TREW, EHRET, 2. t. 10. Tulipifera virginiana &c. CATESBY, *Car.* i. *t.* 48.—PLUKENET, *t.* 117. *f.* 5. &c.

MEDICAL REFERENCES.

RUSH, *Trans. Phil. Col.* i. 183.—BART. *Coll.* 14.—CLAYTON, *Phil. Trans. abr.* viii. 332.—ROGERS, *Inaugural dissertation*, 1802.

PLATE XXXI.

Fig. 1. *A branch of Liriodendron tulipifera.*

Fig. 2. *Stamens presenting different sides.*

Fig. 3. *Pistil.*

Fig. 4. *Fruit.*

Fig. 5. *One of the seeds with its scale or envelope.*

PL. XXXII.

Juglans cinerea

Annin & Smith

JUGLANS CINEREA.

Butternut.

PLATE XXXII.

Of the forest trees which deserve attention for other properties than the uses of their timber, the Butternut is undoubtedly one of the most interesting; its fruit, bark and juices being all convertible to use. In favourable situations it becomes a large tree, having frequently a trunk of three feet in diameter. It is abundant in the Northern and Middle States, as well as in the Western country. Some parts of the District of Maine, I am told, produce woods of considerable extent, consisting wholly of this tree. Michaux tells us, that it is common in the states of Kentucky and Tennessee, that it abounds on the banks of Lake Eric, the Ohio and even the Missouri. The same author states that it is found in the mountainous

parts of Carolina and Georgia, but that he has not met with it in the lower or level portions of the Southern States. It is variously known by the names of *Butternut*, *Oilnut* and *White Walnut.*

The genus *Juglans* or *Walnut* appertains to the Linnæan class *Monœcia* and order *Polyandria.* Its natural orders are *Amentaceæ* of Linnæus and *Terebintaceæ* of Jussieu.

This genus has its *barren flowers in aments with a six-parted calyx; its fertile flowers with a four-cleft superior calyx; a four-parted corolla; two styles; and a coriaceous drupe with a furrowed nut.*

The species *cinerea* has its *leafets numerous, oblong-lanceolate, rounded at base, downy underneath, serrate. Fruit oblong-ovate with a terminal projection, viscid and hairy; nut oblong, acuminate, with a rough, indented and ragged surface.*

The leaves of the Butternut tree when fully grown are very long, consisting of fifteen or seventeen leafets, each of which is two or three inches long, rounded at base, acuminate, finely serrate and downy.

The flowers appear in May before the leaves are expanded to their full size. The barren flowers hang in large aments from the sides of the last year's shoots, near their extremities. The

scales which compose them are oblong and deeply cleft on each side into about three teeth or segments. The anthers are about eight or ten in number, oblong and nearly sessile. The fertile flowers grow in a short spike at the end of the new shoot. They are sessile and universally pubescent and viscid. When fully grown, they seem to consist of a large oblong germ and a forked feathery style. The top of the germ, however, presents an obscurely four-toothed calyx. Within this is a corolla of four narrow lanceolate petals growing to the sides of the style. The style divides into two large, diverging, feathery stigmas nearly as long as the germ. These flowers are somewhat later than the aments in their appearance. The fruit is sessile, several together on the sides and extremity of a long peduncle. It is of a green colour, brown when ripe, oblong-oval, pointed, hairy and extremely viscid. It contains a nut which is of a dark colour, carinated on both sides, sharp pointed, its whole surface roughened by deep indentures and sharp prominences. The kernel is more regular than in most nuts of its kind, is very oily, pleasant to the taste when fresh, but acquires a rancid taste by age.

The bark of the branches affords a large quantity of soluble matter, chiefly of the extractive kind. In a concentrated tincture I have not been able to detect any appearance of resin. No evidence of tannin is produced by the test of gelatin. A brownish black colour is caused by the sulphate of iron. The distilled water possesses the taste of the bark in a considerable degree. We are authorized to conclude that water is an adequate solvent for this article, and experience has shewn that the watery extract is one of its best preparations.

The sap of the Butternut tree is saccharine, like that of the Maple, and may be procured in large quantities. In the third volume of the Massachusetts Agricultural Repository is an account of an experiment made on this tree by Mr. M. P. Gray. He states that four trees, the trunks of which were only from eight to ten inches in diameter, produced in one day nine quarts of sap, from which was made one pound and a quarter of sugar. This quantity, it appears from his statement, is equal if not superior to that which the maple affords in the same vicinity.

The inner bark of this tree, especially that obtained from the root, affords one of the most mild and efficacious laxatives which we possess. It is

commonly employed in the form of an extract, which preparation is kept in our druggists' shops. Ten or twelve grains of this extract operate gently, and twenty or thirty grains with considerable activity on the bowels. It has been used for many years in this town by the most respectable practitioners. The late Dr. Warren thought highly of its efficacy, and employed it extensively in various complaints, especially in dysentery. During the revolutionary war, when foreign medicines were scarce, this extract was resorted to by many of the army surgeons, as a substitute for more expensive imported drugs. In dysentery it seems at one time to have acquired a sort of specific reputation.

From numerous trials which I have made with this medicine, it appears to me to possess the qualities of an useful and innocent laxative. When fresh and properly prepared, it is very certain in its effect, and leaves the bowels in a good state. In cases of habitual costiveness it is to be preferred to more stimulating cathartics, and many persons whose state of health has rendered them dependent on the use of laxative medicines, have given this the preference after the trial of a variety of other medicines.

A patent medicine, long vended in this state under the name of Chamberlain's Bilious Cordial, was a tincture of this bark combined with various aromatic seeds.

The bark is said to be rubefacient when externally applied, and even capable of exciting a blister. Of this I have had no experience.

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Juglans cinerea, LINNÆUS, *Sp. pl.*—JACQUIN, *Ic. rar.* i. *t.* 192.—WILLDENOW, *arb.* 156.—WANGENHEIM, *Amer.* 21. *t.* 9. *f.* 21.—MICHAUX, ii. 191.—PURSH, ii. 636.

Juglans oblonga RETZ. *Obs.* i. p. 10.—Juglans cathartica, MICHAUX, FIL. *Arbres forestiers*, i. 165.

MEDICAL REFERENCES.

THACHER, *Disp.* 245.—BART. *Col.* 23. 32.—RUSH, *Med. Obs.* i. 112.

PLATE XXXII.

Fig. 1. *A branch of Juglans cinerea in flower, the leaves not fully expanded.*

Fig. 2. *A scale or barren flower from the ament magnified.*

Fig. 3. *A fertile flower magnified.*

Fig. 4. *The fruit.*

PL. XXVIII

Veratrum viride Sowerby & Smith Sc.

VERATRUM VIRIDE.

American Hellebore.

PLATE XXXIII.

In many parts of the United States the swamps and wet meadows, which have been converted into mowing lands, are peculiarly marked in the early part of spring by two species of plants. These are the *Ictodes fœtidus* already described (Pl. xxiv) and *Veratrum viride*, usually denominated *Poke root* and *Hellebore*. Both of these plants spring up more rapidly than the grass around them, and from the largeness and bright green colour of their leaves they are often the most noticeable objects in the places of their growth. As the season advances, the Ictodes continues only a tuft of radical leaves, while the Veratrum sends up a straight leafy stalk, which frequently acquires the full height of a man.

This plant is not only found in boggy meadows, but by the sides of brooks in rocky and mountainous situations, from Canada to Carolina. Its flowering time is from May to July.

The *Veratrum album* or *White Hellebore*, a well known medicinal plant found in most countries of Europe, has a very close resemblance to the American species. It is, however, a smoother plant, and differs somewhat in its flowers, bractes and stalks.

The genus Veratrum, on account of the diversity of its flowers, was placed by Linnæus in his class *Polygamia* and order *Monœcia*. Those more recent botanists, who omit this class, have transferred the genus to *Hexandria trigynia*.

The generic character of *Veratrum* consists in a *six-parted corolla without calyx. Stamens inserted in the receptacle. Capsules three, many seeded. A part of the flowers barren.* The species *viride* has a *downy panicle with the partial bractes longer than their pedicels. Segments of the corolla thickened on the inside at base.*

The root of this plant is thick and fleshy, its upper portion tunicated, its lower half solid and sending forth a multitude of large whitish radicles. The stem is from three to five feet high, roundish, solid, striated and pubescent. Through-

out the greater part of its length it is closely invested with the sheathing bases of the leaves. The lower leaves are large, from half a foot to a foot long, oval, acuminate, pubescent, strongly plaited and nerved; the lower part of their edges meeting round the stem. The upper leaves become gradually narrower and the uppermost, which perform the office of bractes, are linear-lanceolate. The flowers are numerous and distributed in compound racemes axillary from the upper leaves, and terminal; the whole forming a sort of panicle. Peduncles roundish, downy. Bractes boat-shaped, acuminate, downy. The pedicel of each flower is many times shorter than its bracte. Calyx none. Corolla divided into six green, oval, acute, nerved segments, of which the alternate ones are longest. All the segments are contracted at base into a sort of claw with a thickened or cartilaginous edge. Stamens six with recurved filaments and roundish, two-lobed anthers. Germs three, cohering, with acute recurved styles as long as the stamens. A part of the flowers are barren and have only the rudiments of styles, so that the plant is strictly polygamous. The seed vessel consists of three capsules united together, separating at top and opening on their inner side. Seeds flat imbricated.

The root of the Veratrum has a bitter taste accompanied with acrimony, and leaves a durable impression on the mouth and fauces when it has been chewed or swallowed. It abounds with a resinous juice, which adheres closely to a knife with which the root has been cut. This resin dissolves abundantly in alcohol. When water is added to the solution, a white turbidness gradually appears rendering the liquid opaque, but without sediment. The decoction has an intensely bitter taste. It is not rendered turbid by alcohol although some slight flocculi are separated after standing. It is probable that this bitterness resides in an extractive principle. The distilled water of the root has a slightly unpleasant taste, without bitterness or pungency.

This plant in its medicinal powers resembles the Veratrum album or White hellebore of Europe. It is an acrid emetic and a powerful stimulant, followed by sedative effects. As a medicine or as a poisonous plant, it has been known from an early period. The aborigines of the country were fully apprized of its activity. Josselyn in his voyage to New England, which took place not long after the first settlement of the country, informs us that the young Indians had a custom of electing their chiefs by a sort of ordeal institnted

with the roots of this plant, which he denominates "white hellebore." A portion of this root was repeatedly given to each individual, and he whose stomach made the most vigorous resistance or soonest recovered from its effects was considered the stoutest of the party and entitled to command the rest.

Kalm tells us that the people of this country, at the time of his travels, employed a decoction of this plant externally in the cure of scorbutic affections, and for the destruction of vermin. He further states, that corn before planting was soaked in a strong decoction of the Veratrum to protect it against the birds which infest our fields and devour the grain after it is deposited in the ground. When the corn is thus prepared, it is observed, that those birds which swallow it become giddy and fall to the ground, an example, the writer informs us, which has the effect to frighten the remainder of the tribe away from the place.

Since the celebrity acquired by the European white hellebore as a remedy for *gout*, that plant being for a time supposed the basis of the celebrated *Eau medicinale*; the attention of some practitioners has been turned to investigating the properties of the American plant, which so close-

ly resembles the Veratrum album in its external habitudes. The result of such trials as have been made, establishes beyound a doubt the medicinal similarity of these two vegetables. I have employed the American plant in dispensary practice in the treatment of obstinate cases of chronic rheumatism. Other practitioners have applied it to the treatment of gout, and of cutaneous and other affections. From the sum of my observations and knowledge respecting it, I am satisfied that the root, when not impaired by long exposure and age, is in sufficient doses a strong emetic, commencing its operation tardily, but continuing in many instances for a long time; in large doses affecting the functions of the brain and nervous system in a powerful manner, producing giddiness, impaired vision, prostration of strength and diminution of the vital powers. Like the Veratrum album and Colchicum antunmale, the violent impression which it makes upon the system has arrested the paroxysms of gout and given relief in some unyielding cases of protracted rheumatism. Like those substances, it requires to be given with great caution and under vigilant restrictions. The solutions of this article have appeared to me more powerful in proportion to their quantity than the substance, probably in consequence of a part of

the powder being thrown out in the first efforts to vomit, before a perfect solution of its active parts in the stomach could have taken place.

A course of experiments with this article was made sometime since in the Boston Almshouse by Dr. John Ware, the results of which he has obligingly communicated to me. They cannot be better stated than in his own words.

"I gave this plant," says he, "in the first place with a view to ascertain its action on the stomach and alimentary canal. The doses in which it was administered amounted to from two to ten grains. I began with a small quantity, and increased it very gradually in order to guard against the occurrence of those violent and dangerous effects which I had been led to apprehend from the descriptions given of the operation of the white hellebore. A slight and general account of the experiments will give the most satisfactory view of the effects of this root as an emetic.

"It was administered in about thirty cases. *In the first case* two grains were given; this only produced slight and temporary nausea.

"*In three* instances three grains were administered; in two of these vomiting was produced; in one of them to a considerable degree—in the other slight—in the third no effect whatever was

produced.—*Of gr.* iv. Four doses, of which only one operated, and then the operation was inconsiderable.—*Of gr.* vi. Fifteen doses were given—ten of these operated perfectly well; as complete and thorough vomiting was produced as follows from the case of any other emetics—in the eleventh case nausea only ensued—and in the remaining, no effect whatever was perceived.—*Of gr.* viii. Four doses—of these, two failed entirely and two operated satisfactorily.—*Of. gr.* x. Only one dose was given—this operated very thoroughly.

"I did not find, as I had expected, that this substance was uncommonly violent or distressing in its operation. Patients, in general, did not complain of any thing unusual, and when they were particularly questioned as to their sensations, they told of nothing more than those usually occurring during the effects of a brisk emetic. It seemed to produce vomiting rather more severely than an ordinary dose of ipecac—but not more than one of antimony. Indeed, its operation may fairly be said to be about as violent and distressing as that of any other emetic whose effects in evacuating the stomach are equally thorough. In a few instances, however, there was a complaint of very violent and painful retching—

and of dizziness at the time and for a short time after—still these effects were not common nor excessive.

"As to its influence as an emetic upon diseased states of the system, there were few opportunities of administering it where any considerable derangement existed. In those cases which did occur it did not appear to be inferior to the common emetics.

"The degree of operation did not seem to be much increased by the increase of the dose of the medicine. Doses of six grains appeared, when they took effect, to produce vomiting as thorough and complete, as that which followed from larger doses; except that the larger were perhaps more speedy in operating. I could find no cause for the failure of so many of those cases in which the dose amounted to six or eight grains, except an insensibility in the patient to the stimulus of the medicine; and this was rendered more probable from the circumstance that generally in those instances, the substance failed in producing any effect whatever; nausea did not often occur when vomiting was not to follow it, and in no instance was it very clear that purging was produced.

"Indeed this appeared to be rather a singular circumstance relating to this substance, and one

in which it differs from most or all other emetics. These articles, when they fail of producing vomiting, generally occasion a determination downwards, and thus produce all the phenomena of cathartic medicines. This effect is also frequently produced when they have operated in their peculiar way. But in no instance did this appear to be the case with the Hellebore. Some patients, indeed, said that it operated upon them by stool very slightly—but on strict inquiry I did not think that the medicine had had any effect in this way, and that what was told me proceeded from a desire in the persons to attribute some sort of effect to what had been given them.

"In the greater number of the cases, the Hellebore was longer before it produced vomiting than is the case generally with other emetics. It did not often operate in less than three quarters of an hour or an hour—but sometimes the interval was extended to two or three hours—and in one case, although the dose was administered at twelve at noon, its effects were not produced until between nine and ten o'clock in the evening. This tardiness in manifesting its effects on the system corresponds with what has been observed with respect to the European species.

"I made a few experiments with the powder of the Veratrum album in order to compare its powers with those which existed in our native species. It was given in six cases—of two doses of three grains—neither produced any effect—one of four was not more effectual—six grains produced some vomiting, but not to any considerable extent—seven no effect whatever—and eight produced in about four hours after taking it considerable effect. If these experiments are to be depended upon, the foreign certainly is not more powerful than the native species.

"I endeavoured next to ascertain what degree of power the Hellebore was possessed of over cutaneous diseases. It has the reputation in the country of some efficacy in these complaints. The ointment and decoction were applied in a number of cases, and it certainly proved to be an application of considerable power. Its effects in some cases amounted to a removal of the disease entirely—and in most, some diminution of it followed, which was more or less durable.

"In one case where there was an eruption about the wrists and other parts of the body, supposed to be the itch—the ointment (made by simmering together a dram of Hellebore in an ounce of lard) after being applied for some time, removed the

disease. The cure, however, was protracted and tedious.

"A second case was that of a boy who had on the back of his head, what appeared to be the commencement of Tinea capitis. The ointment made in the same way as that before mentioned, except that simmering was omitted, removed it in the course of a fortnight. It returned again in the course of a few weeks and was again destroyed by the same application. It did not recur so long as I had an opportunity of observing the child, which was, however, not long.

"In one clear case of itch, the ointment failed of producing any beneficial effect, and it was necessary to have recourse to the usual remedy.

"An instance of a very troublesome and irritating eruption upon the hands and fingers, accompanied by a venereal taint of the system, was very much relieved by this ointment. Its final removal, however, could not be attributed to this, since the patient was under the influence of mercury at the same time.

"In some other cases both the ointment and decoction were used with success for a time, but the effects they produced were only partial and temporary."

Of the power of this plant to relieve the formidable disease of gout, we have the most satisfactory evidence. A composition intended to imitate the celebrated *Eau medicinale* was prepared in England by Mr. Moore from the wine of white hellebore and wine of opium in the proportion of three parts of the former to one of the latter. This compound was used by many arthritic patients both in Europe and America with great success in relieving the paroxysms of the disease. In Boston a considerable number of individuals have been induced to make trial of the remedy, and generally with advantage. But I am informed by several of our most repectable apothecaries, that for a long time, especially during the late war, when the white hellebore could not be obtained from Europe, the American plant was used in the preparation of the medicine upon the supposition of its being the same with the European. Various gouty patients made use of it, and no difference was perceived by them or their physicians in its mode of operation or effect upon the disease. Some were relieved by small doses, which did not even nauseate, such as fifteen or twenty drops, repeated if necessary. Others found a drachm of the mixture necessary, which quantity affected them unpleasantly by vomiting

or otherwise. Some experienced such severe effects as to deter them after one trial from a repetition of the experiment. In general the paroxysm of gout was completely suspended by the operation of the medicine.

On the whole, we have sufficient knowledge of the American green hellebore, to feel assured that it is a plant of great activity, closely resembling in its properties the Veratrum album of Europe; and that like that plant it has given relief in the paroxysms of gout and in rheumatism. Whether the original *Eau medicinale* be a preparation of Veratrum, Colchicum, or any other acrid narcotic, it is not of consequence here to decide. These plants, with several others that might be mentioned, are similar in their operation, and probably influence the system when under disease, much in the same way. Some individuals obtain relief from moderate doses, which do not occasion nausea or any very disagreeable effects. Others have not derived benefit except from such quantities as bring on vomiting. Some have experienced very distressing consequences, such as excessive sickness, purging, great prostration of strength, impaired vision, and even total insensibility, where the dose has been imprudently large.

The wine of green hellebore is prepared like that of the white, by imusing for ten days eight ounces of the sliced root, in two pints and an half of Spanish white wine. Before being given, in gout, it is combined with one fourth part its quantity of wine of opium. Of this compound the dose varies from twenty drops to a drachm.

From some observations made by Sir Everard Home respecting the wine of Colchicum autumnale, it is probable that the wine of Veratrum may be less violent in its effects, if freed from the sediment which it deposits by standing.

Of the substance of the root freshly powdered, from two to six grains will be found a sufficient dose. For medicinal use, however, in most cases it is probable that the liquid preparation above described promises more.

The external application of the ointment and decoction sometimes produces the same effect on the stomach as the internal use of the plant. In one instance a patient was nauseated and vomiting brought on by the ointment applied to an ulcer of the leg. I have known similar consequences from a strong decoction in cutaneous affections. Might the topical application of this plant be of any service in gout?

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KALM, *travels*, ii. 91.—JOSSELYN, *Voyage to New England*, p. 60.—THACHER, *N. Eng. Journal.*

PLATE XXXII.

Fig. 1. *Leaf and flowers of Veratrum viride.*
Fig. 2. *Petal magnified.*
Fig. 3. *Stamens.*
Fig. 4. *Pistils.*
Fig. 5. *Capsule.*
Fig. 6. *Section of the capsule, showing the seeds.*
Fig. 7. *A seed.*

PL. XXXIV.

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Gentiana Catesbæi

Annin & Smith Sc.

GENTIANA CATESBÆI.

Blue Gentian.

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PLATE XXXIV.

I am indebted to the late Dr. Macbride, of Charleston, S. C. for my specimens of this medicinal plant, and for a quantity of its root in preservation. Many of the perennial species of Gentian have a great degree of bitterness in the root, and among these the *Gentiana lutea*, or common imported Gentian of the shops, stands preeminent. Of the American species, several bear great resemblance in taste and effect to the European plant. No one, however, which I have examined approaches so near to the officinal root in bitterness, as the species which is the subject of this article. This species was formerly confounded with the *Gentiana saponaria*, a fine autumnal plant, common in the Northern and Mid-

dle states. It differs widely, however, from that species in the size of its leaves, the length of its calyx, the open mouth of its corolla and shape of its segments. An imperfect figure of this plant, published by Catesby sixty years ago, has been quoted by subsequent botanists as belonging to G. Saponaria. It has now been very properly distinguished by Walter and Elliott, who have applied to the new species the name of its earliest delineator.

The genus *Gentiana* has *a monopetalous corolla; a capsule one-celled and two-valved, with two longitudinal receptacles.* The species *Catesbæi* has *a rough stem; leaves ovate-lanceolate; segments of the calyx longer than the tube; mouth of the corolla open, its outer segments subacute, inner segments bifid and fimbriate.*

This genus is placed by Linnæus in his class and order *Pentandria, Digynia.* A part of the species, however, depart from the character of this class, and constitute one of those instances in which the general rules of the arrangement are violated, that apparently natural genera may not be divided. A part of the Gentians have five stamens and a five-cleft corolla; others have four stamens and a four-cleft corolla; others have a still different number. Yet so uniform is the

structure of the fruit, and so great the apparent affinity of the plants, that botanists have hitherto kept the genus entire, even though the variety of form as well as of number in the calyx, corolla, and stamens might perhaps justify a subdivision.

This genus belongs to the natural order *Rotaceæ* of Linnæus, and to Jussieu's *Gentianæ*.

The Gentiana Catesbæi has a branching and somewhat fleshy root. Stem simple, erect, rough. Leaves opposite, ovate or lanceolate, slightly three-nerved, acute, rough on the margin. Flowers crowded, nearly sessile, axillary and terminal. Segments of the calyx linear-lanceolate, varying in length, exceeding the tube and sometimes more than twice its length. Corolla large, blue, ventricase, plaited; its border ten-cleft, the five outer segments roundish and more or less acute, the five inner bifid and fimbriate. Stamens five, with dilated filaments and sagittate anthers. Germ oblong-lanceolate, compressed, supported by a sort of pedicel. Style none, stigmas two, oblong, reflexed. Capsule oblong, acuminate, one-celled, two-valved.

The dried root of this vegetable has at first a mucilaginous and sweetish taste, which is soon succeeded by an intense bitter, approaching nearly to that of the officinal gentian. This quality

appears to reside in a bitter extractive principle, soluble in both alcohol and water. A little resin is developed by the pearly appearance which the tincture assumes on the addition of water. The decoction, however, is nearly equal in bitterness to the tincture, and both these solutions exhibit this property much more powerfully than the root in substance. No astringency appears in this root, and nothing remarkable in the distilled water.

I have found the root of this plant in a variety of instances in which I have used it, to resemble very nearly the imported Gentian in its properties, being but little inferior to it in strength or efficacy. Like that substance it invigorates the stomach and gives relief in complaints arising from indigestion. Dr. Macbride, at whose suggestion I first employed it, entertained a high opinion of its tonic power in cases of debility of the stomach and digestive organs.

In Mr. Elliott's Botany of the Southern States, we are told, that in the form of a decoction it is used with decided advantage in cases of pneumonic, where the fever is nervous, and that it acts as a tonic and sudorific. A tincture of it is esteemed as a remedy in dyspepsia, given in doses of one fourth or half an ounce. It is said to increase

the appetite, prevent the acidification of the food, and to enable the stomach to bear and digest articles of diet, which before produced oppression and dejection of spirits.

BOTANICAL REFERENCES.

Gentiana Catesbæi, WALTER, *Flora Carol.* p. 109.—ELLIOTT, *Botany of the Southern States*, i. 340.

MEDICAL REFERENCE.

ELLIOTT, *loc. cit.*

PLATE XXXIV.

Fig. 1. *Gentiana Catesbæi.*

Fig. 2. *A flower with the corolla drawn open to show the inner plicæ.*

Fig. 3. *Stamens and pistil in their natural situation.*

Fig. 4. *Stamens separate.*

Fig. 5. *Pistil.*

LAURUS SASSAFRAS.

Sassafras Tree.

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PLATE XXXV.

Almost every section of the United States produces the Sassafras tree. It not only inhabits every latitude from New England to Florida, but we are told it is also found in the forests of Mexico and even of Brazil. Its peculiar foliage and the spicy qualities of its bark render it a prominent object of notice, and it seems to have been one of the earliest trees of the North American continent to attract the attention of Europeans. Its character as an article of medicine was at one time so high, that it commanded an extravagant price, and treatises were written to celebrate its virtues. It still retains a place in the best European Pharmacopæias.

Pl. XXXV.

Laurus Sassafras

Annie R. Smith Sc.

The genus of trees and shrubs known by the name of *Laurus* comprises many of the most useful as well as celebrated products of the vegetable world. The Bay tree or Laurel of the ancients, the Cinnamon tree, Cassia tree, Camphor tree, and Avocado pear, are either of them sufficient to give notoriety to the genus to which they belong. This genus has *a calyx of from four to six divisions; nectary of three bisetose glands, or wanting; stamens variable in number; fruit a drupe; flowers often polygamous.* The species *Sassafras* is *polygamous, with leaves entire and lobed.*

The Laurels constitute one of the few genera assigned by Linnæus to his class *Enneandria*, to the first order of which they belong. Jussieu has placed them with his *Lauri*, to which they give name. The propriety with which they have been associated with the Linnæan natural order *Oleraceæ* is of a very questionable nature.

The Sassafras tree, of the United State, arrives, in favourable situations, to a tall stature and large circumference. In the Northern States, it is of smaller size, yet trees are sometimes met with about Boston which attain to nearly the average height of the woods around them, and have trunks a foot in thickness. The bark of the

trunk is much cracked and of a greyish colour; the young twigs are of a reddish green. The leaves are remarkable for the variety of their form on the same tree. Those which proceed first from the bud are usually oval and entire; the next have the same form with a lobe on one side; the last and most numerous have regularly three lobes. They grow on petioles, and are very downy when young, but become smoother by age. The flowers grow from the sides of the branches below the leaves, having the scales of the former bud for their floral leaves. They are disposed in short slender racemes of a pale green colour, each flower having six oblong segments. Different trees produce barren and perfect flowers. The barren flowers have nine stamens, six of which are exterior and three interior. The perfect flowers, the kind represented in our plate, have only six stamens, with short filaments and heart-shaped anthers. Nectary none. Germ roundish with a straight, erect style. Fruit an oval drupe of a deep blue colour, supported by a red incrassated pedicel. Only a small number of the trees produce fruit.

The bark of this tree has a fragrant smell and a very agreeable spicy taste. The flavour of the root is most powerful, that of the branches

more pleasant. The flavour and odour reside in a volatile oil which is readily obtained from the bark by distillation. It is of a light colour, becoming darker by age, very pungent, and heavier than water, so that it sinks in that fluid when the drops are sufficiently large to overcome the repulsion at the surface. The bark and pith of the young twigs abound with a pure and delicate mucilage. A very small quantity of the pith infused in a glass of water gives to the whole a ropy consistance, like the white of an egg. This mucilage has the uncommon quality that it is not precipitated, coagulated, or rendered turbid by alcohol. It continues in a perfectly transparent state when mixed with that fluid, though it does not unite with it. When evaporated to dryness, it leaves a light coloured, gum-like residuum.

The volatile oil and the mucilage appear to contain all the medicinal virtue of the tree.

The bark and wood of the Sassafras were formerly much celebrated in the cure of various complaints, particularly syphilis, rheumatism and dropsy. Its reputation, however, as a specific in those diseases, particularly the first, has fallen into deserved oblivion, while it is now recognized only with regard to its general properties, which are those of a warm stimulant and diaphoretic.

It is retained by the Dispensatories as an ingredient in several preparations, particularly the compound decoction of guaiacum, formerly called "decoction of the woods;" and the compound decoction of Sarsaparilla, formerly the "Lisbon diet drink." These preparations are useful as sudorifics in rheumatism, some cutaneous diseases, and the sequelæ of syphilis. They derive, however, more of their efficacy from their other ingredients, than from the Sassafras, a principal part of the efficacy of which is dissipated by boiling.

The most proper mode of employing the Sassafras is in the form of its volatile oil, which may be given in very small quantities as an antispasmodic, stimulant and sudorific. It is too acrid to be taken unmixed, and should therefore be dissolved in spirit and mixed with water or syrup.

The mucilage of the pith of this tree is peculiarly mild and lubricating, and has been used with much benefit in dysentery, and in catarrhal, as well as calculous affections. Some eminent surgeons have employed it as a lotion in the most inflammatory stages of ophthalmia, to which its softness renders it extremely well suited.

The wood of the Sassafras tree is of a light texture, but is said to be durable when exposed

to the weather. It has been thought capable of repelling insects by its odour, and on this account has been employed for trunks, bedsteads, &c. A property of this kind, however, is wrongly attributed to it, since the wood retains scarcely any odour after a few months drying.

BOTANICAL REFERENCES.

Laurus Sassafras, LINN. *Sp. pl.*—PURSH, i. 277.—NUTTALL, i. 259.—WOODVILLE, iv. *t.* 234.—MICHAUX, FIL. *Arbres forestiers*, iii. 173.—Laurus foliis integris, trilobisve.—TREW, *Ehr.* *t.* 69, 70.—Cornus mas odorata, &c.—PLUKENET, *Alm.* 120, *t.* 222.—CATESBY, *Car.* i. *t.* 55.

MEDICAL REFERENCES.

MURRAY, *Apparatus*, iv. 535.—KALM, *travels*, ii.—HOFFMAN *Obs. Phys. Chem.* 31.—CULLEN, *Mat. Med.* ii. 200.—CLAYTON, *Phil. Trans. Abr.* viii. 332.—BREMANE, *Sassafrasologia* in 1627.

PLATE XXXV.

Fig. 1. *Laurus Sassafras, a branch with perfect flowers of the natural size.*

Fig. 2. *A stamen magnified.*

Fig. 3. *Pistil, ditto.*

Fig. 4. *Fruit.*

APOCYNUM ANDROSÆMIFOLIUM.

Dog's Bane.

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PLATE XXXVI.

THIS is a branching perennial plant, found from Canada to Carolina about the sides of fences and the borders of woods. It has a peculiarly neat aspect derived from its smoothness, its leafless and coloured stalk, bushy top and delicate flowers. Like the other American species, it is a lactescent plant, with a fibrous bark. It attains its flowering period in June and July.

The genus Apocynum has *a bell-shaped corolla; a nectary of five corpuscles surrounding the germ; anthers adhering to the stigma by the middle; follicles two; seeds with down.*

The present species is *glabrous, its stem erect and branching; cymes lateral and terminal; corolla spreading.*

Pl. XXXVI.

Apocynum androsæmifolium

Annin & Smith Sc.

Class *Pentandria*, order *Digynia*; natural orders *Contortæ*, Linnæus; *Apocineæ*, Jussieu.

The Apocynum Androsæmifolium grows often to the height of five or six feet, though its common elevation is three or four. Its stalk is smooth, simple below, branching repeatedly at top, red on the side exposed to the sun. Leaves opposite, smooth on both sides, paler beneath, ovate, acute, on short petioles. The flowers grow in nodding cymes from the ends of the branches and axils of the upper leaves, furnished with minute acute bractes. Calyx five-cleft, acute, much shorter than the corolla. Corolla white tinged with red, monopetalous, campanulate, with five acute, spreading segments. Stamens five, with very short filaments, and connivent, oblong arrow-shaped anthers, cohering with the stigma about their middle. The nectary consists of five oblong glandular bodies alternating with the stamens. Germs two, ovate, concealed by the anthers. Stigma thick, roundish, agglutinated to the anthers. The fruit is a pair of slender linear-lanceolate follicles, containing numerous imbricated seeds each crowned with a long pappus or down, and attached to a slender central receptacle.

Every part of the Apocynum when wounded emits copiously a milky juice. When chewed, the root communicates an unpleasant and intensely bitter taste. It exhibits, when dry, the following chemical phænomena.—If a solution in ether be mixed with alcohol, the alcohol, though not turbid at first, becomes so when the ether evaporates. An aqueous infusion or decoction is of a deep red colour and intensely bitter. A solution in alcohol is nearly destitute of colour, but retains the whole bitterness of the plant, and is not disturbed by the addition of water. When submitted to distillation a slight oily film floats on the surface of water in the receiver.—From these facts we may conclude that the Apocynum contains, 1. A bitter extractive principle. 2. A colouring principle soluble in water and not in alcohol. 3. Caoutchouc. 4. A volatile oil.

In various parts of the Eastern States this plant has been shewn to me by country practitioners under the name of *Ipecac*. This name is applied to it from its power of acting on the stomach in the same manner as the Brazilian emetic. Several physicians, among whom is Dr. Richardson of Medway, inform me that they have found about thirty grains of the root to evacuate the contents of the stomach as effectually as two

thirds the quantity of Ipecacuanha. In my own trials it has appeared to me much less powerful than the latter substance, and although it produces vomiting, yet this power is diminished by keeping, and appears to be eventually destroyed by age. When used for the purpose of an emetic, the recently powdered root should be employed.

The sensible and chemical qualities of this root seem to promise a good effect when given in small doses as a tonic medicine to the stomach. My observations on this subject may hereafter be more mature. *(See Appendix.)* We have certainly very few indigenous vegetables which exceed the Apocynum in bitterness. Perhaps its emetic property when given in large doses may be owing to this quality. Most bitter vegetables produce vomiting when administered in large quantities.

Kalm observes in his travels in North America, that in some parts of the country this plant was suspected of poisonous properties like those of the Rhus vernix. The country people informed him that the milky juice rubbed on the hands produced blistering in many persons, and that some were affected in the same way even by the effluvium of the plant.—I know of no other authority than that stated above for the existence of such a property in the Apocynum. The plant is

common and well known in Massachusetts, yet I have never heard it suspected of deleterious properties.

The flowers of the Apocynum have a power of catching flies and small insects which was ascribed by Dr. Darwin to an irritability in the internal organs. Mr. Curtis in the Botanical magazine, has considered this subject at large, and ascribes the property to a more rational cause. In consequence of the close convergency of the anthers and their adhesion to the stigma, a narrow fissure or slit exists, which becomes more contracted near the top. The insect in search of the honey at the bottom of the flower, inserts his proboscis between the stamens into the cavity within them. In extricating it from this situation the proboscis is sometimes caught in the fissure, and in proportion to the efforts made by the insect to escape it becomes more closely wedged in the upper part of the slit, so that its deliverance by its own powers becomes at length impracticable. Musquitoes, gnats, and small flies are frequently found dead in this confinement.

BOTANICAL REFERENCES.

Apocynum androsæmifolium, Lin. *Sp. pl.*—Curtis, *Botanical Magazine*, t. 280.—Darwin, *Botanic Garden*, ii. 182.—Michaux, *Flora*, i. 121.—Pursh, i. 179.

MEDICAL REFERENCE.

Kalm, *Travels*, iii. 26.

PLATE XXXVI.

Fig. 1. *Branch of Apocynum androsæmifolium.*
Fig. 2. *Pair of follicles.*
Fig. 3. *Cone formed of the united stamens.*
Fig. 4. *Stamen detached.*
Fig. 5. *Side view of the calyx, nectaries and germs.*
Fig. 6. *Front view of the same.*
Fig. 7. *A seed.*

DIRCA PALUSTRIS.

Leather Wood.

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PLATE XXXVII.

THE diversity of climate in different latitudes of the United States does not prevent this shrub from appearing in the most rigorously cold as well as in the warmest sections of the country. I have seen it growing plentifully on the banks of the Kennebec, in Maine, and Mr. Bartram found it in great vigour on the Savannah river in Georgia. It is a marshy shrub frequenting low woods and the vicinity of water, flowering in April and May. It is commonly of humble growth, though Mr. Bartram found specimens six or seven feet in height. It is remarkable for the flexibility of its wood and toughness of its bark, which are so great that it cannot be broken without great difficulty. The Aborigines employed

PL.XXXVII

Dirca palustris

Annan & Smith Sc

it for their cordage, and from its great tenacity the name of *Leather wood* has been applied to it in most parts of the United States. The Canadian French called it *Bois de Piomb* or *Leaden wood* from its flexibility.

The generic character of Dirca consists in a *tubular corolla without calyx, having its border obsoletely toothed. Stamens longer than the corolla. Berry one-seeded.*

The genus contains but a single species.

Class *Octandria*, order *Monogynia*. Natural orders *Vepreculæ*, Lin. *Thymelææ*, Juss.

The Dirca is an irregular shrub somewhat distinguished by the horizontal tendency of its branches and leaves. The branches have an interrupted or jointed mode of growth. The leaves are scattered or alternate, with very short petioles. They are oval, entire, subacute, downy, when young, smooth and membranous when fully grown, and pale on the under side. The flowers appear long before the leaves. Previously to their emerging they exist in miniature within a small hairy bud, which occupies a sheath or cavity in the end of each flowering branch. They are commonly in bunches of three together with their peduncles cohering. Each flower is about half an inch long, of a yellow colour and without ca-

lyx. The corolla is funnel-shaped, with a contraction near the base and another in the middle, its border dilated, and slightly and irregularly toothed. Stamens eight, much longer than the corolla, the alternate ones longest, the filaments capillary and inserted into the tube; the anthers roundish. Germ ovate placed obliquely, the style appearing to issue from one side. The style is capillary, curved, and longer than the stamens. The fruit is a small oval, acute, red, one-seeded berry.

Chemically examined, the bark of this shrub discovers a slightly resinous character by the pearliness which its tincture assumes on admixture with water. The decoction is somewhat mucilaginous and deposits slight flocculi on the addition of alcohol. Iron and gelatin produce no evidence of tannin or gallic acid. The distilled water has an unpleasant odour, but is void of acrimony.

The bark of the Dirca has a peculiar and rather unpleasant taste. When swallowed, it leaves a sensation of acrimony in the fauces which continues for some time. If taken in the quantity of six or eight grains, it produces a sense of heat in the stomach and at length brings on

vomiting. This effect pretty certainly occurs if the bark be recent or freshly powdered.

A variety of observations on this shrub have been made by my pupil, Dr. John Locke, who first called my attention to the examination of its properties. He found on experiment that not only the distilled water, but the decoction also was void of acrimony, and that in the boiled bark this property was very much diminished, though still present. The watery extract had considerable bitterness, but scarcely any of the peculiar acrimony of the plant. Taken in doses of a drachm, it did not produce any very sensible effect. Alcohol without heat acquired but slight sensible properties from the bark. Nothing came over by distillation with alcohol, but the alcohol remaining in the retort had acquired the acrimony. The spirituous extract procured by evaporating this decoction was equal to one twenty fourth of the bark from which it was obtained. It contained the acrimony in a concentrated form, producing a more powerful effect on the fauces than the fresh bark. It was largely but not completely soluble in water.

Dr. Locke gave the freshly dried root to various patients in doses of from five to ten grains, which quantity in most instances proved powerfully

emetic, and sometimes cathartic. It was found to be deteriorated by keeping, and did not produce the same effects when very old. In consequence of some statements which have been made in regard to its vesicating properties, Dr. Locke applied portions of the bark moistened with vinegar to the skin of his arm. In twelve hours no effect was produced, in twenty four some redness and itching took place and in thirty a complete vesication followed.

The fruit of the Dirca has been suspected of narcotic properties. Dr. Perkins, of Hanover, N. H. has communicated the case of a child which had eaten these berries with effects like those produced by Stramonium, such as stupor, insensibility, and dilatation of the pupils. An emetic brought up the berries and the child gradually recovered. A medical student who took several of the berries found that they produced nausea and giddiness.

The medicinal action of the bark of the Dirca probably depends on its acrid constituents, which appear to be partly of a resinous and partly of a volatile nature. Its properties appear somewhat allied to those of Polygala senega, for which it might perhaps be substituted in small quantities. It is best given in substance, though on ac-

count of the tenacity of its fibres it is difficult of subdivision. After beating in a mortar it resembles fine lint more than powder. Its vesicating properties appear too feeble to promise much utility.

I have introduced the Dirca in this place, not so much because it has been yet applied to any medical purpose of great importance; but because it would be improper, in a work like the present, to pass over unnoticed a shrub of such decided activity.

BOTANICAL REFERENCES.

Dirca palustris, LIN. *Amœnitates academicæ*, iii. *t.* I. 6. 7.—DUHAMEL, *Arb.* vi. *t.* 212.—PURSH, i. 236.—MICHAUX, i. 268.—BARTRAM, *Travels*, 309.—KALM, *Travels*, ii. 148.

MEDICAL REFERENCE.

B. S. BARTON, *Coll.* 32.

PLATE XXXVII.

Fig. 1. *A branch with leaves of Dirca palustris.*
Fig. 2. *A branch in flower.*
Fig. 3. *Fruit.*
Fig. 4. *Germ and style much magnified.*
Fig. 5. *Magnified corolla, laid open.*
Fig. 6. *Flower magnified.*

RUBUS VILLOSUS.

Tall Blackberry.

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PLATE XXXVIII.

THE family of shrubs comprized under the term *Rubus*, including the various species of *Raspberry*, *Blackberry*, *Dewberry*, &c. is extensively diffused throughout the United States. Many of them are known as troublesome brambles, a few are unarmed, and a certain number are nearly herbaceous. Some are distinguished by the elegance of their flowers, and others by the deliciousness of their fruit. The Rubus villosus is one of the most common and interesting species. It abounds among the brushwood of neglected fields and pastures, about fences and the borders of woods, from the Eastern to the Southern states. Being of rapid growth, it is frequently troublesome to the farmer by spread-

PL. XXXVIII

Rubus villosus

Annin & Smith Sc.

ing in his lands, although it offers some amends for the intrusion by the abundance and fine flavour of its fruit. It is commonly called *tall* or *high* blackberry in distinction from the *R. trivialis* or *low* blackberry, which it greatly resembles in the quality of its fruit. It is in flower in June and its fruit is ripe in August and September.

For the generic character, it has a *five-cleft calyx; five petals; and a compound berry composed of one-seeded acini.*—This species is *pubescent, bristly and prickly, the leaves in threes or fives, leafets ovate, acuminate, serrate, pubescent, with the petioles prickly; flowers racemed.*

Class *Icosandria*, order *Polygynia;* natural orders *Senticosæ*, Lin. *Rosaceæ*, Juss.

This shrub has a tall, branching, prickly stem, which is more or less furrowed and angular. Leaves mostly in threes on a channelled, hairy petiole. A few are solitary and some quinate. Leafets ovate, acuminate, sharply and unequally serrate, covered with scattered hairs above, and with a thick soft pubescence underneath. The terminal leafet is pedicelled, the two side ones sessile. The petiole and back of the middle rib are commonly armed with short recurved prickles. The flowers grow in erect racemes with a hairy, prickly stalk. The pedicels are

slender, an inch or two in length, covered with glandular hairs and supported by lanceolate bractes. Calyx divided into five ovate, concave, hairy segments ending in an acuminate point or a lanceolate leafet. Petals five, white, ovate or oblong, concave, contracted into a short claw at base. Stamens very numerous, with roundish anthers and slender, white filaments. Germs numerous, covering a conic central receptacle. Styles capillary, arising from the sides of the germs, persistent. Fruit a black, shining, compound berry formed of pulpy acini attached to the receptacle, each containing a single oblong seed.

The bark of the root of this bramble is the part which has been medicinally employed. It is a pure and strong astringent, which property it manifests both by its sensible effects and by chemical examination. When treated with the sulphate of iron both the tincture and decoction assume a beautiful dark purple colour and throw down a copious precipitate. A precipitate also takes place on the addition of gelatin, which is copious, white and opaque. The alcoholic solution is in part decomposed by water. The substance precipitated does not occasion the uniform turbidness which usually attends the separation

of resins, but exhibits a flocculent appearance like that of congulated mucilage. These flocculi, however, when collected and dried, exhibit the common resinous properties on exposure to heat. I subjected the dried bark to distillation, but the distilled water was nearly insipid, possessing only a very slight flavour of the root.

The properties of this bark are those of a very powerful astringent. I have tried its operation sufficiently to become satisfied of its efficacy both internally and externally used in a variety of cases which admit of relief from medicines of its class. It is true that our list of vegetable astringents has become very numerous and the cases which require them are perhaps less frequent than was formerly imagined; yet as we continue to import and consume various foreign medicines of this kind, we ought not to exclude from attention native articles of equal efficacy. Professor Chapman, of Philadelphia, expresses a very decided opinion in regard to the powers of this substance. "Of the vegetable astringents," says he, "this I have reason to believe is among the most active and decidedly efficacious in certain cases. To the declining stages of dysentery after the symptoms of active inflammation are removed, it is well suited, though I have given it, I think, with

greater advantage under nearly similar circumstances, in cholera infantum. To check the inordinate evacuations which commonly attend the protracted cases of this disease, no remedy has ever done so much in my hands. Even two or three doses will sometimes so bind the bowels that purgatives became necessary. Being so powerfully astringent, this medicine is useful in all excessive purgings, and especially in the diarrhea of very old people, as well as when it occurs at the close of diseases. During my attendance in our public institutions I had abundant opportunities of testing its efficacy in these cases."

The fruit of the blackberry is among the most delicious productions of the uncultivated forest. To an agreeable combination of sweetness and acid it adds an aromatic fragrance which is surpassed by few of the lighter fruits produced among us. It differs in size and perfection in different seasons, warm and dry summers being most favourable to its perfect maturity. Our markets, however, are rarely destitute of this fine fruit in the months of August and September.

Some other species of Rubus are closely allied to this in the qualities of their fruit and bark, particularly the *Rubus procumbens*, commonly called *low* or *running* blackberry or dewberry.

The fruit of this species is usually larger but produced in smaller quantity from the inflorescence being nearly solitary. The bark is not less astringent than in the present species.

BOTANICAL REFERENCES.

Rubus villosus, AITON, *Kew*, ii. 210.—WILLDENOW, ii. 1085.—MICHAUX, i. 297.—PURSH, i. 346.

MEDICAL REFERENCES.

CHAPMAN, *Therapeutics and Mat. Med.* ii. 474.—THACHER, *Disp.* 341.

PLATE XXXVIII.

Fig. 1. *A specimen of Rubus villosus in flower.*
Fig. 2. *Stamen.*
Fig. 3. *Pistils.*
Fig. 4. *The ripe fruit.*

CASSIA MARILANDICA.

American Senna.

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PLATE XXXIX.

This tall and luxuriant plant is found in rich soils in the vicinity of water from New England to Carolina, and westward to the banks of the Missouri. The most northern situation in which I have known it decidedly indigenous, is on the banks of the Quinebaug river near the southern boundary of Massachusetts. It is, however, cultivated in gardens for medicinal use much further to the north. It is a vigorous herbaceous perennial with stalks four or five feet high, having their summits covered in July and August with brilliant yellow flowers.

The extensive genus *Cassia* has *a five-leaved calyx* and *five petals; anthers unequal, the three uppermost barren, the three lowermost longer,*

PL. XXXIX.

Cassia Marilandica

Annin & Smith

curved and beaked. Legume two-valved.—The species Marilandica has *eight or nine pairs of leafets, which are oblong-lanceolate, and mucronate; an obovate gland on the petiole. Racemes axillary and terminal; legumes linear and curved.*

Class *Decandria*, order *Monogynia*. Natural orders *Lomentaceæ*, Linn. *Leguminosæ*, Juss.

The stems, which grow in bunches and often attain the height of five or six feet, are round, striated, and invested with a few scattered hairs. Petioles compressed, channelled above, bearing from eight to ten pairs of leafets, which are oblong, smooth, somewhat hairy at the edges, pale on the under side, supported by short crooked pedicels, and mucronated with a rigid bristle at the end. On the base of the petiole is a large ovate pedicelled gland, of a shining green, terminating in a dark point at top, which is sometimes double. Each petiole is also furnished with a pair of linear-subulate, ciliate, deciduous stipules. The flowers grow in axillary racemes, extending quite to the top of the stem. The peduncles are slightly furrowed, pedicels supported by bractes like the stipules, and marked with minute, blackish, glandular hairs. Leaves of the calyx yellow oval, obtuse, the lateral ones longest. Petals five, bright yellow, spatulate, concave, very

obtuse, three ascending and two descending. Stamens ten with yellow filaments and brown anthers. The three upper have short abortive anthers. To these succeed two pairs of deflexed linear anthers. The remaining three, or lowermost, are much longer, crooked, and taper into a sort of beak, the middle one being shortest. The anthers open by a terminal pore. Germ descending with the lower stamens, hairy; style ascending, stigma hairy, moist. The fruit consists of long legumes which are pendulous linear, curved, swelling at the seeds, and furnished with slight hairs.

The predominant constituents of the leaves in this plant appear to be resin extractive, and a volatile matter. The tincture is of a dark brown colour and is rendered extremely turbid by water. The infusion and decoction have a lighter colour and the peculiar taste of the plant. The distilled water is nauseous. It is found that both the infusion and decoction answer for medicinal use, yet it is probable that the tincture would be more strongly operative, did not the sedative effects of the alcohol prove a balance for the additional parts of the medicine dissolved.

The Cassia Marilandica is related to the oriental *Senna* in its botanical habit, and nearly re-

sembles it in its medicinal virtues.* Neither of these plants is to be ranked among the most active cathartics, and they require to be taken in much larger quantities than aloes, rhubarb or

* There is no doubt that the true Alexandrian Senna is the product of the *Cassia Senna* of Linnæus and of Willdenow. Lamarck has occasioned an unnecessary confusion on this subject, and misled other botanists, by changing the Linnæan name *C. senna* to *C. lanceolata ;* while he has appropriated the name C. senna to the variety β of Linnæus, which is the Italian senna, since very properly named *C. Italica.* See Rees' Cyclopedia, Art. Cassia, &c. The African plant is accounted the most active, although the Italian Senna cultivated in Jamaica, according to Dr. Wright, proved fully equal to it in efficacy.

The greater part of the Senna consumed in the United States is imported from the East Indies. Smaller quantities occasionally reach us from different ports of the Mediterranean and Red seas. The common India senna has a lanceolate leaf narrow and acute; petioles without glands, bearing from five to nine pairs of leaves; and a flat oblong curved legume. Medicinally considered, it is one of the most valuable sorts, operating with mildness and certainty. The facility and cheapness with which it is obtained in India, has long caused it to predominate in our markets.

The India senna, which I have examined, has been very pure, consisting only of leaves of Cassia. The Egyptian has frequently a slight admixture of foreign leaves which are nauseous and bitter.

The Cassia senna would doubtless succeed in our Southern states. The product, consisting of the whole leaves of the plant, must necessarily be large, and would well reward the attention of planters. Ripe seeds may probably be found among the senna of the shops which will vegetate, if not too old. According to Roxburgh and Carey, the Arabian senna cultivated at the Bengal garden is a biennial plant.

jalap, to produce their desired effect. Hence the common form of administering senna is in infusion, a large portion being made to communicate its strength to water at a time. As far as I have been able to observe, about one third more of the Cassia marilandica is required to produce a given effect, than of the C. senna. This objection will prevent it from superseding the senna of the shops, although the facility, with which it may be raised in any part of the United States, will render it a convenient medicine where cheapness is an object. It is already cultivated in gardens for medicinal use, and the infusion and decoction are considerably employed by families and country practitioners.

BOTANICAL REFERENCES.

Cassia Marilandica, LIN. *Sp. pl.*—MARTYN, *Cent. t.* 23.—MICHAUX, *Flora*, i. 261.—PURSH, i. 306.—NUTTALL, i. 280.—Cassia mimosæ foliis, &c.—DILLENIUS, *t.* 260, *f.* 339.

MEDICAL REFERENCES.

B. S. BARTON, *Coll.* 32.—THACHER, *Disp.* 178.—CHAPMAN, *Therapentics.*

PLATE XXXIX.

Fig. 1. *Cassia Marilandica.*

Fig. 2. *The three upper stamens.*

Fig. 3. *The fourth and fifth ditto.*

Fig. 4. *The sixth and seventh ditto.*

Fig. 5. *The three lowest ditto.*

Fig. 6. *A legume.*

PL. XL.

Nicotiana Tabacum

Annan & Smith Sc.

NICOTIANA TABACUM.

Tobacco.

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PLATE XL.

At the time of the discovery of America the Tobacco plant was cultivated by the natives in the West India islands and in different parts of the continent, especially those bordering on the Gulf of Mexico. Whatever may have been its native climate, we need not trace it farther back than this period; and can incur but little risk in considering it as indigenous to the southern parts of the United States in their present enlarged extent. [*Note* B.] It is an annual plant capable of perfecting its flowers and fruit in almost any part of the Union, yet seldom found growing spontaneously except in cultivated grounds or their vicinity.

The genus *Nicotiana* has a *funnel-shaped corolla, with its border somewhat plaited. Stamens inclined; stigma emarginate. Capsule two-celled, two* or *four-valved.* The species *Tabacum*, represented in our plate, has its *leaves ovate-lanceolate, sessile, decurrent; flowers panicled, acute.*

Class *Pentandria*, order *Monogynia.* Natural orders *Luridæ*, Linn. *Solanaceæ*, Juss.

The common Tobacco has a long fibrous root; a stalk five or six feet high, erect, round, hairy, and viscid, branching at top. Leaves sessile, very large, ovate or lanceolate, acuminate, viscid, of a pale green colour. Bractes linear, acute. Flowers forming a panicle on the ends of the stem and branches. Calyx swelling, hairy, glutinous, half as long as the corolla, ending in five acute segments. Corolla funnel-shaped, swelling toward the top, the border expanding, with five acute lobes; the tube of a greenish white, the border red. Filaments inclined to one side, with oblong anthers. Germ ovate, style long and slender, stigma cloven. Capsule ovate, invested with the calyx, two-celled, two-valved, but opening crosswise at top; partition contrary to the valves. Seeds very numerous, small, somewhat reniform, attached to a fleshy receptacle.

It is a remarkable law of the animal economy, that the power of use and habit is capable of reconciling the system to bear with impunity what in its unaccustomed state proves highly deleterious and even fatal. It is a fact that most substances in the Materia Medica lose their effect after the continuance of their use for a certain length of time, so that if we would realize their original operation, we must increase their dose in proportion as the body becomes accustomed and insensible to their stimulus. This is particularly exemplified in the narcotics. Many of these substances, which at first are not only nauseous and disgusting in their sensible qualities, but highly injurious in their influence upon health; are so changed in their effect by habitual use, as to become to those who employ them an innocent and indispensible comfort and a first rate luxury of life.

In its external and sensible properties, there is no plant which has less to recommend it than the common Tobacco. Its taste in the green state is acrid, nauseous and repulsive, and a small quantity taken into the stomach excites violent vomiting, attended with other alarming symptoms. Yet the first person who had courage and patience enough to persevere in its use, until hab-

it had overcome his original disgust, eventually found in it a pleasing sedative, a soother of care, and a material addition to the pleasures of life. Its use, which originated among savages, has spread into every civilized country; it has made its way against the declamations of the learned, and the prohibitions of civil and religious authority, and it now gives rise to an extensive branch of agriculture, or of commerce, in every part of the globe.

Tobacco was in use among the aborigines of America, at the time of its dicovery. They employed it as incense in their sacrificial fires, believing that the odour of it was grateful to their gods. The priests of some tribes swallowed the smoke of this plant to excite in them a spirit of divination, and this they did to a degree which threw them into a stupor of many hours continuance. When recovered from this fit of intoxication, they asserted that they had held a conference with the devil, and had learned from him the course of future events. Their physicians also got inebriated with this smoke, and pretended that while under the influence of this intoxication they were admitted to the council of the gods, who revealed to them the event of diseases. *Harriot.*

In 1559 Tobacco was sent into Spain and Portugal by Hernandez de Toledo, and from thence it was carried into France as a curiosity by Jean Nicot or Nicotius, ambassador at the court of Lisbon, whose name is now immortalized by its application to this genus of plants. From this period the use of tobacco spread rapidly through the continent, and in half a century it was known in most countries in Europe. The rich indulged in it, as a luxury of the highest kind; and the poor gave themselves up to it, as a solace for the miseries of life. Its use became so general and so excessive, that in many countries, the constituted authorities, both of church and state, found it necessary to interpose, and to stop the extravagant indulgence in it by the severest prohibitions. James the First of England, besides writing a book against it, called his "Counterblast to Tobacco," gave orders that no planter in Virginia should cultivate more than one hundred pounds. Pope Urban the Eighth published a decree of excommunication against all who took snuff in the church. Smoking was forbidden in Russia under penalty of having the nose cut off. In Switzerland a tribunal *(Chambre du tabac)* was instituted for the express purpose of trying transgressors in Tobacco. A Turk, who was found

smoking in Constantinople, was conducted through the streets of that city with his pipe transfixed through his nose.

Even in this country, where the use of Tobacco originated, we find our puritanic ancestors guarding against its abuse by salutary statutes. In the old Massachusetts colony laws is an act laying a penalty upon any one "who shall smoke tobacco within twenty poles of any house;" or who shall "take tobacco in any inn or common victualling house, except in a private room, so as that neither the master of the said house nor any other guest shall take offence thereat."—In the earliest records of Harvard University soon after its foundation, is a regulation of this kind. "No scholar shall take tobacco, unless permitted by the president, with the consent of their parents and guardians, and on good reason first given by a physician, and then in a sober and private manner."

While the legal authorities in various parts of the world took upon them to control the abuse of this fascinating weed, the literati of different countries entered warmly into the discussion of its merits and its faults. Among its advocates were Castor Duranti and Raphael Thorius, both of whom wrote Latin poems expressly in its praise.

The performance of the latter is entitled a "Hymn to Tobacco," and is very lavish in ascriptions to this plant, which he styles the "gift of heaven and the ornament of earth." So warm were the prejudices of its advocates, that it obtained the reputation of a general panacea, and the catalogue of diseases which it was announced to cure, amounted almost to a complete nosology.

But the opinions of its adversaries were not less extravagant upon the other extreme. It is remarkable that in the days of its first general introduction, no man spoke about it with coolness or indifference, but every one warmly espoused its censure or its praise. Camden, in his life of Queen Elizabeth, says, that men used Tobacco every where, some for wantonness and some for health's sake; and that "with insatiable desire and greediness, they sucked the stinking smoke thereof through an earthen pipe, which they presently blew out again at their nostrils;—so that Englishmen's bodies were so delighted with this plant, that they seemed as it were degenerated into barbarians."

Dr. Venner in a work entitled *Via recta ad vitam longam*, published at London in 1638, gives a brief summary of the injuries done by Tobacco. "It drieth the brain, dimmeth the sight, vitiateth

the smell, hurteth the stomach, destroyeth the concoction, disturbeth the humours and spirits, corrupteth the breath, induceth a trembling of the limbs, exsiccateth the winde pipe, lungs and liver, annoyeth the milt, scorcheth the heart and causeth the blood to be adusted. In a word, it overthroweth the spirits, perverteth the understanding, and confoundeth the senses with sudden astonishment and stupiditie of the whole body."

A poetical phillippic, called "Tobacco battered," was published in the reign of King James by Joshua Sylvester, in which he compares Tobacco to gunpowder, and pipes to guns; making the mischief of the two equal. But the most celebrated of all invectives against Tobacco was the "Counterblast" of King James I. That weak monarch gave vent to his prejudices against this herb in a publication, in which he professes to disprove all the alleged grounds for the toleration of Tobacco, and warns his subjects in a most earnest manner not to sin against God, and harm their own persons and goods, and render themselves scorned and contemned by strangers, who should come among them; by persevering in a custom loathsome to the eye, hateful to the nose, and baneful to the brain."

Such were the commotions excited by the introduction and spreading of an article, whose use has now become so common as scarcely to attract notice. This article is the product of several species of Nicotiana, but chiefly of the N. tabacum or Virginian Tobacco, and the N. rustica, sometimes called English Tobacco, and being the sort which Sir Walter Raleigh introduced at the court of Queen Elizabeth. Another species, N. fruticosa, is said to have been cultivated in the East prior to the discovery of America. The Indians on the banks of the Missouri and Columbia rivers cultivate for use the N. quadrivalvis of Pursh and Nuttall. It has been remarked that the Tobacco of warm climates is more mild in its flavour, while that raised in colder latitudes is more strong and pungent. The Bengal Tobacco, of which the sheroots are made, is one of the most weak and mild in its properties. After this is the West India Tobacco which affords the Havanna cigars. Next is the Tobacco of our Southern States, and lastly the Tobacco raised in the northern parts of the Union, which is the most acrimonious and pungent of all.*

* Several varieties of *Nicotiana Tabacum* are cultivated in the United States, of which the principal are the *broad leaved* or *sweet scented*, and the *narrow leaved*.

An elaborate chemical analysis of Tobacco, has been published by M. Vauquelin in the *Annales de Chimie.* His results are, that the broad leaved Tobacco furnishes from its juices the following constituents. 1. A large quantity of animal matter of an albuminous nature. 2. Malate of lime with an excess of acid. 3. Acetic acid. 4. Nitrate and muriate of potash in observable quantities. 5. A red matter soluble in alcohol and water, which swells and boils in the fire, its nature undetermined. 6. Muriate of ammonia. 7. A peculiar acrid, volatile, colourless substance, soluble in water and alcohol, and which appears different from any thing known in the vegetable kingdom. It is this principle which gives to prepared Tobacco its peculiar character, and it is perhaps not to be found in any other species of plant. The medicinal activity of Tobacco evidently resides in this volatile portion, for both the extract and decoction of the plant by long boiling become nearly inert, while the essential or the empyreumatic oil is one of the most deadly poisons known.

Among the substances used by Mr. Brodie in his experiments or vegetable poisons, was the empyreumatic oil of Tobacco prepared by Mr. Brande by distilling the leaves of Tobacco in a

heat above that of boiling water. A quantity of watery fluid came over, on the surface of which was a film of unctuous substance, which he calls the empyreumatic oil. Mr. Brodie found that two drops of this oil applied to the tongue of a young cat with an interval of fifteen minutes occasioned death. A single drop suspended in an ounce of water and injected into the rectum of a cat, produced death in about five minutes. One drop suspended in an ounce and a half of mucilage and thrown into the rectum of a dog, produced violent symptoms, and a repetition of the experiment killed him.

Tobacco has been used both as a luxury and prophylactic, and as a medicine. In the former cases it has not been taken internally, but only kept in contact with absorbing surfaces. It is well known, that to the mouth it is applied in substance and in smoke; and to the nose in the form of powder. The opinion which at one time prevailed of its power to prolong life and to secure immunity from diseases is now pretty fully abandoned. It has no prophylactic reputation except as a preservation for the teeth, and in some degree as a protection against the contagion of epidemics. In both these cases it is entitled to a certain degree of confidence, though

it is probably inferior to many other substances for both these purposes.

As to its effects upon longevity, the great frequency of its use and the facts and observations of Sir John Sinclair render it improbable that when moderately taken, it has any influence in wearing out the constitution, or abridging the usual period of life. But like all other narcotics its excessive use or abuse must impair the health and engender disease. Of the different modes of using Tobacco, I imagine that smoking is the most injurious, and the most capable of abuse, since in this process the active principles of the Tobacco are volatilized with the smoke, and are extensively applied to the lungs as well as the mouth and nose and fauces.

As a medicine, this plant has been employed in a variety of ways for the alleviation and cure of diseases. Externally it has been applied with benefit in tinea capitis and in complaints occasioned by the presence of insects. In the form of a cataplasm applied to the pit of the stomach it occasions severe vomiting. The prostration of strength and other distressing symptoms which attend this application, must prevent its general employment. Still it may be remembered as an auxiliary in cases where other emetics have failed

to operate. A surgeon in the U. S. army informed me that the soldiers had an expedient to exempt themselves from duty, by wearing a piece of tobacco under each armpit, until the most alarming symptoms of real illness appeared in the whole system.

Dr. James Currie has recorded a case of epilepsy cured by the external use of Tobacco. A cataplasm was applied to the stomach for several days about half an hour before the expected return of the paroxysm. A violent impression was produced each time upon the system, the paroxysm prevented and the diseased association effectually broken up. Two cases of obstinate and dangerous intermittent were cured in the same manner by a decoction of half a drachm of Tobacco in four ounces of water, thrown up as an enema, a short period before the time of the paroxysm.

The Tobacco enema was formerly recommended in colic, nepliritic complaints, &c. Of late years it has been extensively employed in strangulated hernia. In cases of this complaint where the taxis has been ineffectually attempted and the usual auxiliaries have failed, an injection made by infusing half a drachm of Tobacco in eight ounces of boiling water for ten minutes, is

found extremely useful. If assisted by the local application of ice to the part, it frequently causes the contents of the sac to return spontaneously, and renders the operation unnecessary, which would be otherwise unavoidable. It operates by its powerfully sedative and relaxing effects, as well as by its cathartic property.

When the infusion is not used, an injection of Tobacco smoke into the rectum frequently produces the same consequences. The smoke may be made to penetrate farther than any liquid, and it is equally efficacious, from the activity of the volatile parts. It was formerly much used in the restoration of persons apparently dead from drowning, but of late years it has gone more into disuse. From the sedative effect of Tobacco, the tendency to syncope and the great prostration of strength which it occasions in ordinary cases; it is probable that its employment in cases of asphyxia from drowning, must assist in extinguishing rather than in rekindling the spark of life.

As a diuretic, Tobacco has been administered internally in doses so small as not to offend the stomach, with very good effect. Dr. Fowler has published a collection of facts relative to its use, principally in dropsy and dysury, from which he

concludes it is a safe and efficacious diuretic. In thirty one dropsical cases in which he employed it, eighteen were cured and ten relieved; and out of eighteen cases of dysury, ten were cured and seven relieved. Dr. Ferriar and several subsequent practitioners have found it a valuable diuretic, although Cullen does not speak very encouragingly of its use. At the present day it does not seem to be extensively in use, having passed into neglect rather because more fashionable remedies have superceded it, than because it has really been weighed and found wanting. It will always deserve trial in obstinate dropsical cases (and such cases it must be confessed are not rare) in which the more common remedies have been tried without benefit. Of the various formulas recommended by Dr. Fowler, the Wine of Tobacco is the only one preserved in the Edinburgh and Massachusetts pharmacopœias, being the one which is believed to extract most fully the virtues of the Tobacco. It is made by digesting for a week, an ounce of the dried Tobacco in a pound of Spanish white wine. The dose is from thirty to eighty drops. Dr. Fowler himself however believed the most effectual mode of administering the Tobacco, was in the form of pills of a grain each.

Tobacco has been employed with some success in the *locked jaw*, both of warm and cold climates. Mr. Duncan, surgeon of Grenada, has published in the Edinburgh Journal the account of a very distressing case of this kind, which was relieved and finally cured principally by enemas of Tobacco smoke. These applications generally produced syncope and deathlike sickness in the patient, but by prudent management of them, the disease was entirely overcome, and recovery took place. Dr. Holmes of Worcester county, Mass. exhibited the infusion of Tobacco, to a patient under violent tetanus, after the more common remedies had been fully tried without effect. The spasms were completely removed and the patient recovered.

This powerful medicine has been also employed with some palliative effect in hydrophobia and certain other spasmodic diseases. Its internal use however requires great caution, since patients have in various instances been destroyed by improper quantities administered by the hands of the unskilful or unwary. Notwithstanding the common use and extensive consumption of Tobacco in its various forms, it must unquestionably be ranked among narcotic poisons of the most active class. The great prostration of

strength, excessive giddiness, fainting, and violent affections of the alimentary canal, which often attend its internal use, make it proper that so potent a drug should be resorted to by medical men, only in restricted doses and on occasions of magnitude.

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PLATE XL.

Fig. 1. *Nicotiana tabacum.*

Fig. 2. *Capsule.*

Fig. 3. *Ripe capsule opening at top.*

Fig. 4. *Transverse section.*

NOTES.

Note A.

A memoir on the cultivation and use of *Asclepias Syraica*, by J. A. Moller, may be found in Tilloch's Philosophical Magazine, Vol. viii. p. 149. Its chief uses were for beds, cloth, hats and paper. It was found that from eight to nine pounds of the silk occupied a space of from five to six cubic feet, and were sufficient for a bed, coverlet and two pillows.—The shortness of the fibre prevented it from being spun and woven alone. It however was mixed with flax, wool, &c. in certain stuffs to advantage. Hats made with it were very light and soft. The stalks afforded paper in every respect resembling that obtained from rags. The plant is easily propagated by seeds or slips. A plantation containing thirty thousand plants yeilded from six hundred to eight hundred pounds of silk.

Note B.

Tobacco was discovered in Cuba, Florida and Mexico, nearly three centuries ago, and was soon after introduced from this continent into Europe. Whether or not any species of it was cultivated in the East before the discovery of America, is a point of no consequence in regard to its American nativity. The extent of country throughout which it was used by the aborigines of this continent, renders it probable that it must have been cultivated in various parts of America for many centuries previous to its discovery.

The following account of the present mode of cultivating Tobacco in our Southern States is extracted from *An Historical and Practical Essay on the Culture and Commerce of Tobacco.* By William Tatham. London, 1800.

First, of preparing the Tobacco Ground.

"There are two distinct and separate methods of preparing the Tobacco ground: the one is applicable to the preparation of new and uncultivated lands, such as are in a state of nature, and require to be cleared of the heavy timber and other productions with which Providence has stocked them; and the other method is designed to meliorate and revive lands of good foundation, which have been heretofore cultivated, and, in some measure, exhausted by the calls of agriculture and evaporation.

"The process of preparing new lands begins as early in the winter as the housing and managing the antecedent crop will permit, by grubbing the under growth with a mattock; felling the timber with a poll-axe; lopping off the tops, and cutting the bodies into lengths of about eleven feet, which is about the customary length of an American fence rail, in what is called a *worm* or *pannel* fence. During this part of the process the negro women, boys, and weaker labourers, are employed in piling or throwing the brush-wood, roots, and small wood, into heaps to be burned; and after such logs or stocks are selected as are suitable to be malled into rails, make clap-boards, or answer for other more particular occasions of the planter, the remaining logs are rolled into heaps by means of hand-spikes and *skids*; but the Pennsylvania and German farmers, who are more conversant with animal powers than the Virginians, save much of this labour by the use of a pair of horses with a half sledge, or a pair of truck wheels. The burning of this brush-wood, and the log piles, is a business for all hands after working hours; and as nightly revels are peculiar to the African constitution, this

part of the labour proves often a very late employment, which affords many scenes of rustic mirth.

"When this process has cleared the land of its various natural incumbrances, (to attain which end is very expensive and laborious,) the next part of the process is that of the hoe; for the plough is an implement which is rarely used in *new* lands when they are either designed for tobacco or meadow.

"There are three kinds of the hoe which are applied to this tillage: the first is what is termed the sprouting hoe, which is a smaller species of mattock that serves to break up any particular hard part of the ground, to grub up any smaller sized grubs which the mattock or grubbing hoe may have omitted, to remove small stones and other partial impediments to the next process.

"The *narrow* or *hilling* hoe follows the operation of the sprouting hoe. It is generally from six to eight inches wide, and ten or twelve in the length of the blade, according to the strength of the person who is to use it; the blade is thin, and by means of a moveable wedge which is driven into the eye of the hoe, it can be set more or less *digging* (as it is termed,) that is, on a greater or less angle with the helve, at pleasure. In this respect there are few instances where the American blacksmith is not employed to alter the eye of an *English*-made hoe before it is fit for use; the industrious and truly useful merchants of Glasgow have paid more minute attention to this circumstance.

"The use of this hoe is to break up the ground and throw it into shape; which is done by chopping the clods until they are sufficiently fine, and then drawing the earth round the foot until it forms a heap round the projected leg of the labourer like a mole hill, and nearly as high as the knee; he then draws out his foot, flattens the top of the hill by a *dab* with the flat part of the hoe, and advances forward to the next hill in the same manner, until the whole piece of ground is prepared. The centre of these

hills are in this manner guessed by the eye; and in most instances they approach near to lines of four feet one way, and three feet the other. The planter always endeavours to time this operation so as to tally with the growth of plants, so that he may be certain by this means to pitch his crop within season.

"The third kind of hoe is the *broad* or *weeding* hoe. This is made use of during the cultivation of the crop, to keep it clean from the weeds. It is wide upon the edge, say from ten inches to a foot, or more; of thinner substance than the hilling hoe, not near so deep in the blade, and the eye is formed more bent and shelving than the latter, so that it can be set upon a more acute angle upon the helve at pleasure, by removing the wedge.

Of the Season for Planting.

"The term, *season* for planting, signifies a shower of rain of sufficient quantity to wet the earth to a degree of moisture which may render it safe to draw the young plants from the plant bed, and transplant them into the hills which are prepared for them in the field, as described under the last head; and these seasons generally commence in April, and terminate with what is termed the *long season in May;* which (to make use of an Irishism) very frequently happens in June; and is the opportunity which the planter finds himself necessitated to seize with eagerness for the *pitching* of his crop; a term which comprehends the ultimate opportunity which the spring will afford him for planting a quantity equal to the capacity of the collective power of his labourers when applied in cultivation.

"By the time which these *seasons* approach, nature has so ordered vegetation, that the weather has generally enabled the plants (if duly sheltered from the spring frosts, a circumstance to which a planter should always be attentive in selecting his plant patch) to shoot forward in sufficient strength to bear the vicissitude of transplantation.

"They are supposed to be equal to meet the imposition of this task when the leaves are about the size of a dollar; but this is more generally the minor magnitude of the leaves; and some will be of course about three or four times that medium dimension.

"Thus, when a good shower or season happens at this period of the year, and the field and plants are equally ready for the intended union, the planter hurries to the plant bed, disregarding the teeming element, which is doomed to wet his skin, from the view of a bountiful harvest, and having carefully drawn the largest sizeable plants, he proceeds to the next operation.

Of Planting.

"The office of *planting* the tobacco is performed by two or more persons, in the following manner: The first person bears, suspended upon one arm, a large basket full of the plants which have been just drawn and brought from the plant bed to the field, without waiting for an intermission of the shower, although it should rain ever so heavily; such an opportunity indeed, instead of being shunned, is eagerly sought after, and is considered to be the sure and certain means of laying a good foundation, which cherishes the hope of a bounteous return. The person who bears the basket proceeds thus by rows from hill to hill; and upon each hill he takes care to drop one of his plants. Those who follow make a hole in the centre of each hill with their fingers, and having adjusted the tobacco plant in its natural position, they knead the earth round the root with their hands, until is of a sufficient consistency to sustain the plant against wind and weather. In this condition they leave the field for a few days until the plants shall have formed their radifications; and where any of them shall have casually perished, the ground is followed over again by successive replantings, until the crop is rendered complete.

Of Hoeing the Crop.

"The operation of *hoeing* comprehends two distinct functions, viz. that of hilling, and that of weeding; and there are moreover two stages of hilling. The first hilling commences, as heretofore described, in the preparation of the field previous to planting the crop, and it is performed, as before explained, by means of the peculiar implement called a hilling hoe; the second hilling is performed after the crop is planted, with a view to succour and support the plant as it may happen to want strengthening, by giving a firm and permanent foundation to its root; and it may be effected according to the demand of the respective plants by a dexterity in changing the stroke with the weeding hoe, without any necessity to recur to the more appropriate utensil.

"The more direct use of the weeding hoe commences with the first growth of the tobacco after transplantation, and never ceases until the plant is nearly ripe, and ready to be *laid by*, as they term the last weeding with the hoe; for he who would have a good crop of tobacco, or of maize, must not be sparing of his labour, but must keep the ground constantly stirring during the whole growth of the crop. And it is a rare instance to see the plough introduced as an assistant, unless it be the *flook plough*, for the purpose of introducing a sowing of wheat for the following year, even while the present crop is growing; and this is frequently practised in fields of maize, and sometimes in fields of tobacco, which may be ranked amongst the best fallow crops, as it leaves the ground perfectly clean and naked, permitting neither grass, weed, nor vegetable, to remain standing in the space which it has occupied.

Of Topping the Plant.

"This operation, simply, is that of pinching off with the *thumb nail** the leading stem or sprout of the plant, which would, if left alone, run up to flower and seed; but which, from the more substantial formation of the leaf by the help of the nutritive juices, which are thereby afforded to the lower parts of the plant, and thus absorbed through the ducts and fibres of the leaf, is rendered more weighty, thick, and fit for market. The qualified sense of this term is applicable to certain legal restrictions founded upon long experience, and calculated to compel an amendment in the culture of this staple of the Virginia trade, so that it shall at all times excel in foreign markets, and thus justly merit a superior reputation. I do not exactly recollect the present limitation by law, which has changed, I believe, with the progress of experience; but the custom is to top the plant to nine, seven, or five leaves, as the quality and soil may seem most likely to bear.

Of the Sucker, and Suckering.

"The *sucker* is a superfluous sprout which is wont to make its appearance and shoot forth from the stem or stalk, near to the junction of the leaves with the stem, and about the root of the plant; and if these suckers are permitted to grow, they injure the marketable quality of the tobacco by compelling a division of its nutriment during the act of maturation. The planter is therefore careful to destroy these intruders with the thumb nail, as in the act of *topping*, and this process is termed *suckering*.

"This superfluity of vegetation, like that of the top, has been often the subject of legislative care; and the policy of supporting the good name of the Virginia produce has dictated the

* "Many of the Virginians let the thumb nail grow long, and harden it *in the candle*, for this purpose: not for the use of *gouging* out people's eyes, as some have thought fit to insinuate."

wisdom of penal laws to maintain her good faith against imposition upon strangers who trade with her. It has been customary in former ages to rear an inferior plant from the sucker which projects from the root after the cutting of an early plant; and thus a *second* crop has been often obtained from the same field by one and the same course of culture; and although this scion is of a sufficient quality for smoking, and might become preferred in the weaker kinds of snuff, it has been (I think very properly) thought eligible to prefer a prohibitory law, to a risk of imposition by means of similitude.

"The practice of cultivating *suckers* is on these accounts not only discountenanced as fraudulent, but the constables are strictly enjoined *ex officio* to make diligent search, and to employ the posse comitatus in destroying such crops; a law indeed for which, to the credit of the Virginians, there is seldom occasion; yet some few instances have occurred, within my day, where the constables have very honourably carried it into execution in a manner truly exemplary, and productive of public good.

Of the Worm.

"There are several species of the worm, or rather *grub* genus, which prove injurious to the culture of tobacco; some of these attack the root, and some the leaf of the plant; but that which is most destructive, and consequently creates the most employment, is the *horn* worm, or large green tobacco worm. This appears to me to be the same species with that which Catesby has described in the second volume of his Natural History of Carolina, p. 94, under the title *eruca maxima cornuta*, or the great horned caterpillar.

"'This caterpillar,' says he, 'is about four inches long, besides the head and tail; it consists of ten joints, or rings, of a yellow colour; on the head, which is black, grow four pair of

horns, smooth and of a reddish brown towards the bottom, jagged or bearded, and black towards the top; on each of the rings arise short, jagged, black horns, one standing on the back, and two on each side; below which is a *trachæa* on each side; likewise the horn of the back of the last ring is longest: the flap of the tail is of a bright bay colour. It hath eight feet, and six *papillæ*.'

"There are, besides this kind, others without horns; all of them of a green colour, so far as I recollect. And this, in Catesby's description, differs in respect to colour; this tobacco worm or *horn* worm, as the planters call it more particularly, being of a pale delicate green; an effect I apprehend which proceeds from the colour of its food when it feeds upon growing tobacco plants. The act of destroying these worms is termed *worming* the tobacco, which is a very nauseous occupation, and takes up much labour. It is performed by picking every thing of this kind off the respective leaves with the hand, and destroying it with the foot.

Of the Term "Firing."

"During very rainy seasons, and in some kinds of unfavourable soil, the plant is subject to a malady called *firing*. This is a kind of blight occasioned by the moist state of the atmosphere, and the too moist condition of the plant: I do not recollect whether the opposite extreme does not produce an effect something similar. This injury is much dreaded by the planter, as it spots the leaf with a hard brown spot, which perishes, and becomes so far a loss upon the commodity. I apprehend there are two stages when the plant is, in a certain degree, subject to this evil effect: the first is whilst growing in the field, the latter when hanging in the tobacco house. I know of no other remedy than constant working the ground while the seed is growing, and careful drying by the use of fire in the tobacco house.

Of the Ripening of the Crop.

"Much practice is requisite to form a judicious discernment concerning the state and progress of the ripening leaf; yet care must be used to cut up the plant as soon as it is sufficiently ripe to promise a good curable condition, lest the approach of frost should tread upon the heels of the crop-master; for in this case, tobacco will be among the first plants that feel its influence, and the loss to be apprehended in this instance, is not a mere partial damage by nippling, but a total consumption by the destruction of every plant.

"I find it difficult to give to strangers a full idea of the ripening of the leaf: it is a point on which I would not trust my own experience without consulting some able crop-master in the neighbourhood; and I believe this is not an uncustomary precaution among those who plant it. So far as I am able to convey an idea, which I find it easier to understand than to express, I should judge of the ripening of the leaf by its thickening sufficiently; by the change of its colour to a more yellowish green; by a certain mellow appearance, and protusion of the web of the leaf, which I suppose to be occasioned by a contraction of the fibres; and by such other appearances as I might conceive to indicate an ultimate suspension of the vegetative functions.

Of Cutting and Gathering the Crop.

"When the crop is adjudged sufficiently ripe to proceed to cutting, this operation is assigned to the best and most judicious hands who are employed in the culture; and these being provided each with a strong sharp knife, proceed along the respective rows of the field to select such plants as appear to be ripe, leaving others to ripen; those which are cut are sliced off near to the ground, and such plants as have thick stalks or stems are sliced down the middle of the stem in order to admit a more free and equal circulation of air through the parts during the process

of curing, and to free the plant, as far as possible, from such partial retention of moisture as might have a tendency to ferment, and damage the staple. The plants are then laid down upon the hill where they grew, with the points of the leaves projecting all the same way, as nearly as possible, so that when the sun has had sufficient effect to render them pliable, they may more easily and uniformly be gathered into *turns* by the gatherers who follow the cutting.

Of Gathering the Crop in.

"For the better comprehending the method of gathering the crop, it is necessary to understand the preparation which must be previously made for facilitating this part of the process.

"In preparing for gathering the crop of tobacco it is customary to erect a kind of scaffold in various places of the tobacco ground which may happen to offer a convenient situation. This is done by lodging one end of several strong poles upon any log or fence which may be convenient, and resting the other end of such poles upon a transverse pole supported by forks, at about five feet from the ground; or by erecting the whole scaffold upon forks if circumstances require it.

"In forming this part of the scaffold in the manner of joists, the poles are placed about four feet asunder from centre to centre, so that when the sticks which sustain the tobacco plants are prepared they may fill the space advantageously by leaving but little spare room upon the scaffold.

"Timber is then split in the manner of laths, into pieces of four feet in length, and about an inch and a half diameter. These are termed the *tobacco sticks;* and their use is to hang the tobacco upon, both by lodging the ends of this stick upon the poles of the scaffold which have been previously prepared in the field, in order to render it sufficiently pliable and in condition to carry into the tobacco-house, to which it is now convey-

ed by such means as the planter has in his power; and by suspending it in the same way in the house, so that the air may pass through it in the process of curing. Instead of this particular method, those who prefer to do so, lay it a short while in bulk upon poles, logs, &c. in the field, before they convey it under cover."

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